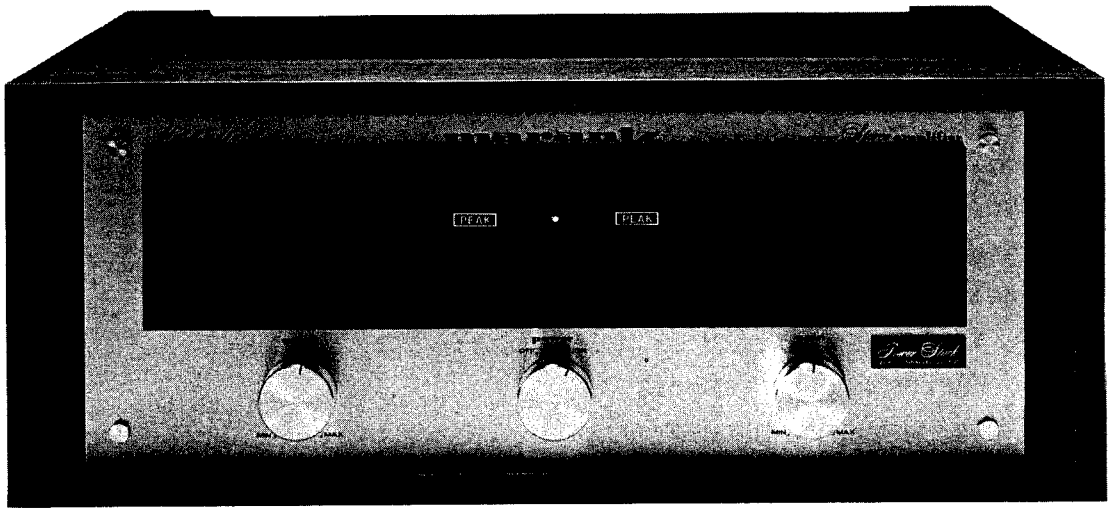
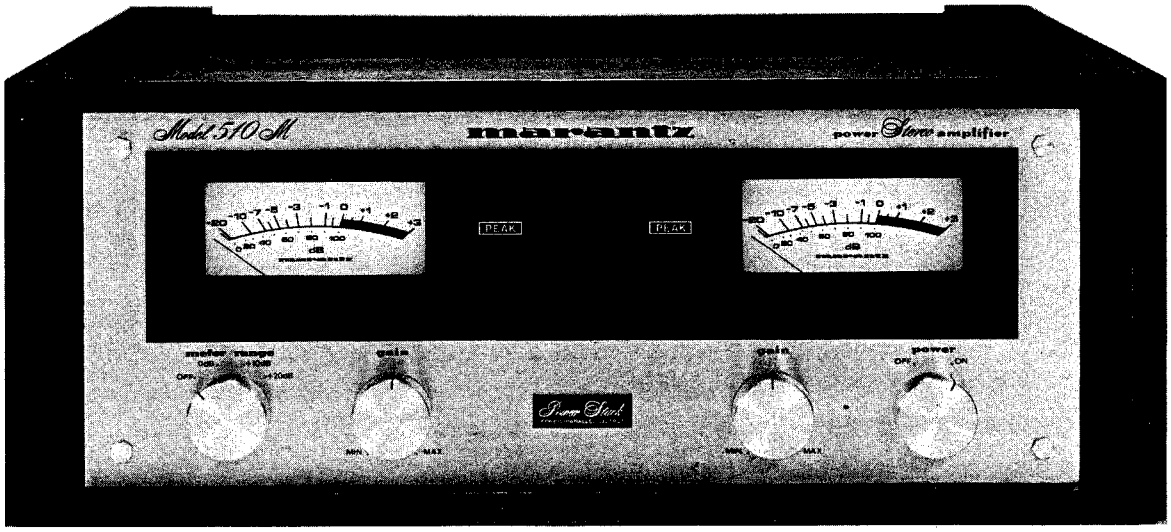


marantz®

MODEL 510/M

SERVICE MANUAL

PROFESSIONAL SERIES



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A WHOLLY OWNED SUBSIDIARY OF SUPERSCOPE INC., CHATSWORTH, CALIFORNIA 91311

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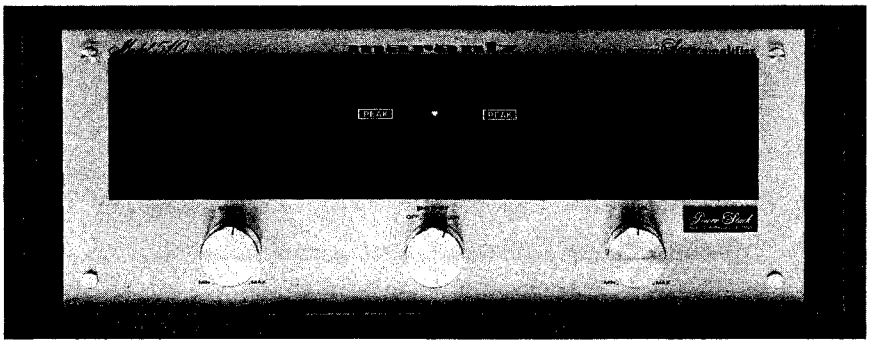


INTRODUCTION

This service manual is intended for use by authorized warranty stations. The manual contains service information for the Marantz Model 510 Series Stereo Power Amplifier manufactured by the Marantz Company, a subsidiary of Superscope Incorporated, Chatsworth, California 91311.

Adjustment, maintenance, and troubleshooting information listed herein should be attempted only by the experienced technician, one knowledgeable in solid state amplifier operation and the use of test equipment. All instructions should be read carefully and understood fully before proceeding with any service.

Symptoms and their remedies listed in the trouble analysis section of this service manual are those which are peculiar to the types that may occur in the Model 510 Series. In the event that field problems arise in the Model 510 Series all servicing facilities will be notified through service bulletins supplementary to this manual. To improve this service, the Marantz Company requests that any field problems and suggestions for improvement be sent to the Technical Services Manager at our corporate location.

CAUTION NOTES :

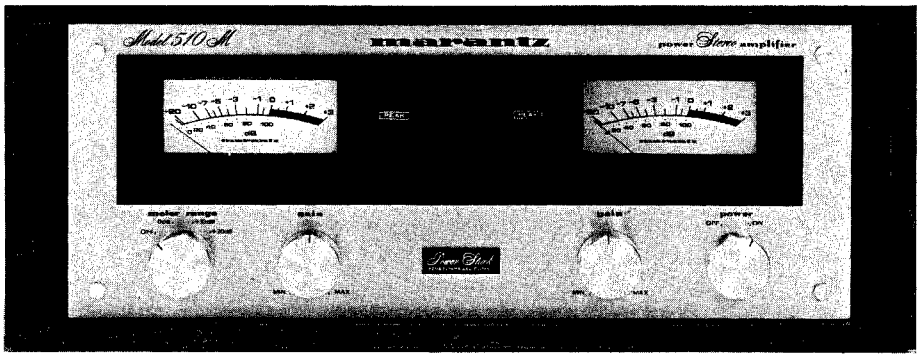
1. Do not discharge capacitors in the unit with a screwdriver blade. The filter capacitors are capable of storing a sizeable charge and the current delivered through a short-circuit may be sufficient to cause personal injury and damage to equipment. Use a 100 W light bulb to discharge filter capacitors.

2. All adjustments should be made using screwdrivers with insulated blades and handles to avoid the possibility of shorting adjacent components.

3. Never connect the loudspeaker terminals of one channel directly in parallel with those of any other, as the output devices will be severely damaged. Such damage is not covered under warranty.

4. Because the amplifier is cooled by fresh air which is drawn in through either the perforated top cover or sides and forced out the rear panel by means of an exhaust fan, allow a minimum of one inch of free space for the top and sides and four inches to the rear of the unit. Do not allow air to recirculate.

5. If the amplifier is to be mounted or stored in an equipment rack, make certain that the rear chassis is adequately supported.



SPECIFICATIONS

Load Impedance:	4 Ohms	8 Ohms	16 Ohms
Minimum Continuous Average Power Output Per Channel, With Both Channels Driven:	350W	256W	140W
Power Bandwidth:	20-20 kHz	20-20 kHz	20-20 kHz
Total Harmonic Distortion: (At Rated Power)	0.10%	0.05%	0.05%
Intermodulation Distortion: (At or Below Rated Power)	S. M. P. T. E. method, less than 0.1%		
Frequency Response:	+0 -3 dB, 2 Hz to 120 kHz at 1 Watt. (Volume Control at full clockwise rotation). +0 dB -0.4 dB, 20 Hz to 20 kHz at rated power or below. (Volume Control at full clockwise rotation).		
Input Sensitivity:	2.26V RMS for 256 watts into 8 ohms.		
Input Impedance:	25 k ohms. The input impedance is not a function of the volume control setting.		
Overload Recovery:	Less than one microsecond for 10 dB overdrive.		
Phase Shift:	Leading 9° at 20 Hz Lagging 10° at 20 kHz.		
Damping Factor:	Greater than 100 at 1 kHz, 8 ohm load.		
Hum and Noise:	110 dB below rated output (8 ohms), noise bandwidth 20 Hz to 20 KHz.		
Power Requirements:	120V, 60 Hz, 1240 Watts at rated power into 8 ohms. 120V, 60 Hz, 1716 Watts at rated power into 4 ohms.		
Square Wave Response:	Tilt - 15% at 20 Hz Undershoot - None Overshoot - None Rise Time - Less than 3 microseconds. Slewing Rate - Greater than ± 15 volts per microsecond.		
Dimensions:	Width: 15-3/8" (39.1 cm) Height: 6-1/8" (15.6 cm) Depth: 14" (35.5 cm)		
Weight:	Approx. 46 lbs. (21 kg)		
Note:	All specifications were measured under the following conditions: ● Both channels driven ● Load resistance 8 ohms unless otherwise specified ● 120V rms, 60 Hz line supply Specification and the design subject to possible modification without notice due to improvements.		

CIRCUIT DESCRIPTION

GENERAL

The 510 Series consist of the Models 510 and 510M. Both amplifiers use identical output amplifier stages and have the same output capabilities. The 510 is different only in that the VU meter and its circuitry have been eliminated.

AC power is applied through a line fuse and power switch to the soft start circuit which limits the peak AC line inrush current to 12 Amps peak (120 Volt version). A relay K1 is activated and switches out a limiting resistor R3 when the filter capacitors C3 and C4 approach full charge. The power transformer utilized has a highly efficient thermal conduction to remove heat from the transformer core. A full wave high current bridge rectifier CR1, supplies the DC potentials to two 10,000 microfarad storage capacitors C3 and C4 having a total stored charge energy of 74 joules, providing the high reserve necessary for high level program demands.

The input signal is applied to the variable gain control, which is buffered from the differential input amplifier by a unity gain dual feedback pair complementary amplifier, Q301 and Q302. The differential input amplifier, Q304 and Q306, receives both negative AC and DC feedback from the output of the power amplifier. The 100 per cent DC feedback, through differential comparison, provides precise control of the zero DC offset voltage at the speaker terminals. The TIME DELAY CIRCUIT at Q303 delays turn-on of the differential current source, Q305, for a period of three to five seconds.

Q307 and Q308 serve as unity gain differential buffer amplifiers, to prevent loading of the input differential amplifier Q304 and Q306 and to provide a low impedance voltage drive to the complementary current source drive transistors, Q309 and Q310. Note that a symmetrical drive signal is produced by an active bi-directional complementary symmetry circuit technique. This results in a completely symmetrical positive and negative drive swing with equal low and high frequency characteristics.

The bias network at Q401 establishes an accurately regulated and temperature controlled bias source for the output devices via the pre-driver transistors Q313 and Q314.

The drive signal from Q309 and Q310 is passed to the complementary pre-drivers Q313 and Q314. These devices, connected as emitter followers, provide a medium impedance drive source for the master drivers, Q403 and Q404, in the Marantz "Power Stack" configuration.

The "Power Stack" is a series parallel connection of eight power output devices in each channel, operating in push pull. The output devices consist of positive NPN paralleled pairs Q406, Q410, and Q407, Q411 and negative PNP paralleled pairs, Q408, Q412, and Q409, Q413. The lower positive and negative paralleled pairs, Q407, Q411 and Q408, Q412 are driven in a Darlington connection from master drivers Q403 and Q404 respectively. The upper paralleled pairs, Q406, Q410 and Q409, Q413 are driven by the positive and negative slave drivers, Q402 and Q405, respectively, Q402 and Q405 are biased and driven by precision metal film resistors in a less than unity gain positive feedback connection from the amplifier center point.

The current sensing resistors R361 and R362 and the protection logic system provide the 5 millisecond delayed load line limiting protection signals that drive the protection transistors Q311 and Q312. The protection transistors, in turn, clamp the drive to the bases of Q313 and Q314 pre-driver transistors whenever long term overload signals are encountered that would exceed the safe operating area of the output transistors.

The output signal is monitored by both the output meters M1 and M2 and the peak overload flasher while simultaneously being applied through the thermostatically activated cut-off switch to the speaker terminals.

The METERS are driven via a precision attenuator and full bridge rectifier system.

The PEAK OVERLOAD FLASHER circuit receives sensing signals from the amplifier output and the protection circuits. The amplifier peak output voltage is compared with the power supply voltage at Q205. The voltage and current signal from the protection circuit is amplified by Q201

and Q203 and applied, together with the comparator output, to the OR gate. The overload signal from the OR gate then triggers a one shot multivibrator, Q207-Q209. A triac CR207 interfaces the one shot to the AC supply that powers an incandescent "PEAK" indicator bulb. The one shot turns on instantaneously and is designed to hold its output in the "on" state for several milliseconds, thus allowing the bulb to come up to full brilliance, so that even the shortest peak transients in musical programs that cause overload (clipping) will be observed.

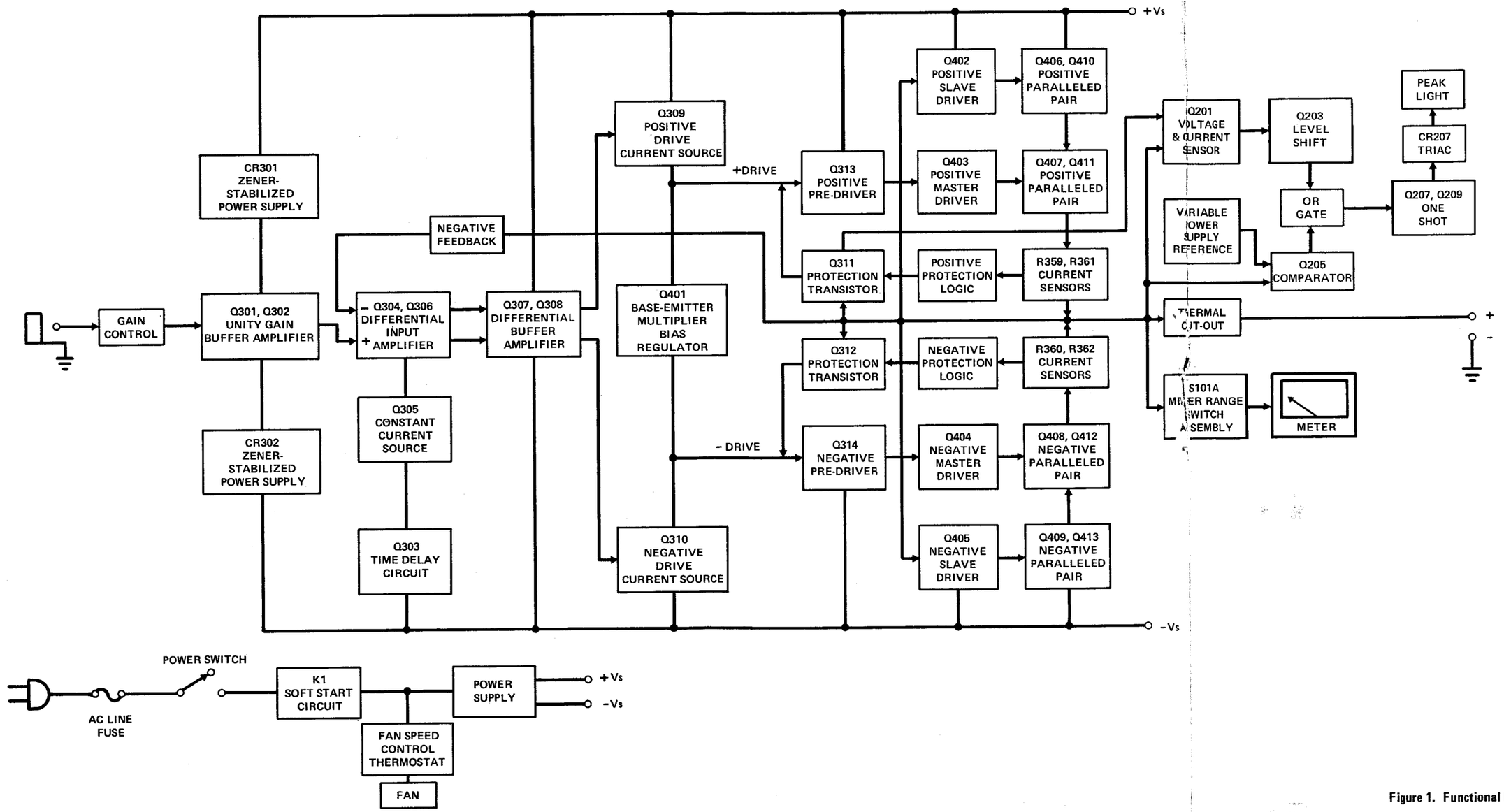


Figure 1. Functional Block Diagram

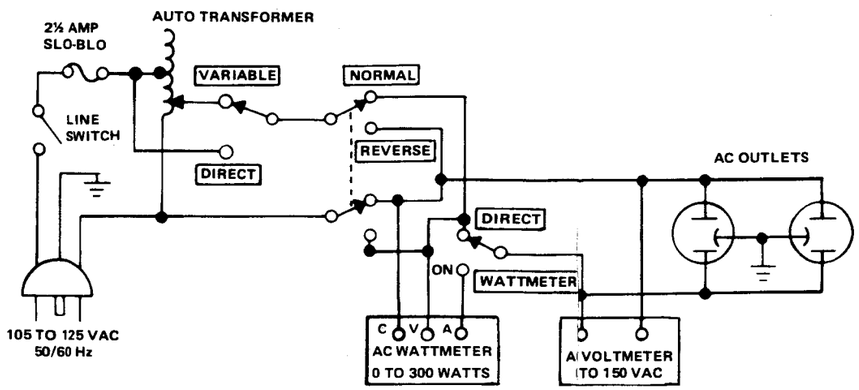


Figure 2. AC Power Control Box, Block Diagram

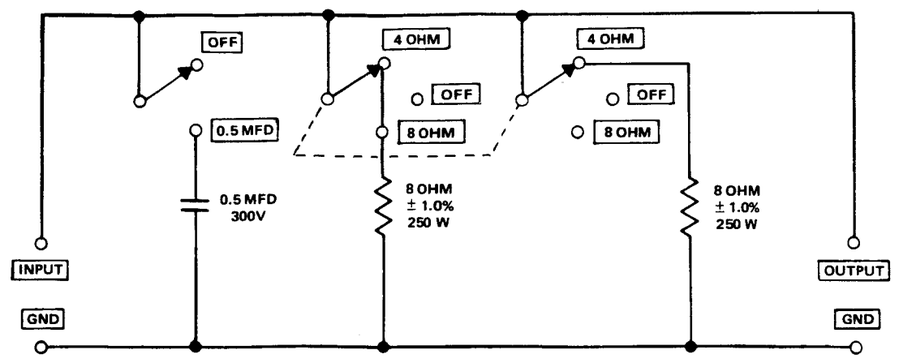


Figure 3. Amplifier Output Load Box, Block Diagram

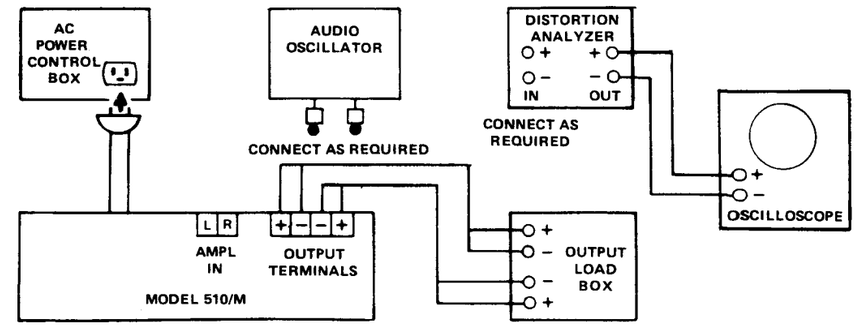


Figure 4. Test Equipment Connection, Block Diagram

PERFORMANCE VERIFICATION

The test equipment listed below is recommended for servicing the Model 510 Series Stereo Power Amplifier. The Performance Verification section of this manual containing the test and adjustment procedures, are based on the use of these items or their equivalent.

ITEM	MANUFACTURER & MODEL NO. OR EQUIVALENT	USE
AC Wattmeter (0-300 Watts)	Simpson Model 1379 (Catalog No. 10975)	Monitor primary power consumption of amplifier.
Line Voltmeter (0-150 VAC)	Simpson Model 1359 (Catalog No. 10320)	Monitor primary line voltage to amplifier.
Variable Autotransformer (0-140 VAC, 22 Amps)	Superior Electric Co. Powerstat Model 136B	Controls level of primary power to amplifier.
Above items to be connected per Figure 2. - AC Power Control Box		
Output Load Resistor (8 ohm ± 1.0%, 250W) 4 Required	Dale Electronic, Inc. RH-250	Provides Load for amplifier output termination.
Output Load Capacitor (0.5 mfd, 300V) 2 Required	Mylar Foil	Provides capacitive load for instability tests
Above items to be assembled per Figure 3. - Amplifier Output Load Box		

Table 1. Recommended Test Equipment

ITEM	MANUFACTURER & MODEL NO. OR EQUIVALENT	USE
Distortion Analyzer (Harmonic Distortion, Intermodulation)	Sound Technology 1700B Hewlett Packard Model 331A or 333A	Measures distortion and voltage of amplifier output
Audio Oscillator	Sound Technology Model 1700B	Sinewave Signal Source
Oscilloscope	Tektronix Model T-932, Philips PM3232	Waveform analysis and trouble analysis
Above items to be connected per Figure 4. or as directed in Test or Adjustment Procedures		
VTVM	Simpson 312, 313, or 314, Triplett 801, Fluke 8000 (Digital)	Voltage and resistance measurements.
Bleeder Resistor 100 W Light Bulb		Discharges filter capacitors.
Shorting Plug	Phono Plug with 600 ohm resistor across center pin and shell	Hum and noise measurements.
Curve Tracer	Heathkit Model IT-1121	Transistor parameter measurements.

Table 1. Recommended Test Equipment (continued)

All tests outlined below should be performed after any adjustment or repair. Refer to the Trouble Analysis section of this manual should any test results be other than what is specified in the test procedures. Unless otherwise specified, all tests are to be performed on both audio channels, with the results indicated applying equally to both channels.

A. TEST EQUIPMENT

Refer to Table 1. for list of recommended test equipment.

B. PRELIMINARY PROCEDURES

1. All tests are performed with the unit under test and the test equipment connected as shown in Figure 4. All tests are conducted with 120 VAC line voltage applied to unit. Unless otherwise specified in the procedure, the test equipment controls will be set to the following positions.

   AC Power Control Box:
   Line Switch . . . . . ON
   Wattmeter Switch . . . . . .DIRECT
   Variable
   Autotransformer . . . . .120 V AC LINE
   Amplifier Output Load Box:
   Channel Select . . SET FOR CHANNEL UNDER TEST
   Load Switch . . . . . AS REQUIRED BY TEST
   Capacitance Switch . . . . . OFF

   During all test procedures the controls of the unit under test will be set as follows unless otherwise specified.

   Gain Controls . . . . . MAXIMUM
   Meter Range . . . . . .OFF

2. Connections, between the output (loadspeaker) terminals of the Model 510 Series and the Output Load Box, must have negligible resistance with respect to the resistance of the load itself. Appreciable resistance adds to the total load, resulting in inaccurate measurement of output power. All test equipment should be connected to the amplifier.

3. Refer to Figure 15, Schematic Diagram and Figure 16, Wiring Diagram to locate detailed parts and wires referenced.

C. DC BALANCE ADJUSTMENT

1. Connect oscilloscope and set vertical amplifier in DC position and connect to L channel loudspeaker terminal.
   CAUTION: Resistor R3 must be shorted with a Jumper whenever an Autotransformer is used.
2. Set Line Switch and Wattmeter to ON and slowly advance autotransformer to 120 VAC observing that the wattmeter indication does not exceed 130 W.
3. Adjust L Channel (Left Heatsink Module) amplifier board, Output Offset potentiometer R310, for an indication of a "line" zero (0V ± 50 mV) as indicated on the oscilloscope.
4. Repeat test for R Channel (Right Heatsink Module).

D. BIAS TEST

1. Set Line Switch to OFF. Preset the Bias Adjustment potentiometer R331 on each amplifier board fully CCW.
2. Disconnect load, set the Wattmeter to ON and set autotransformer to 0.
3. Set Line Switch to ON and slowly advance autotransformer while observing the Wattmeter. The Wattmeter should indicate less than 130 W at 120V. If the Wattmeter indicates either 0 or more than 130 W, unit is defective. Turn off and correct fault.

E. BIAS ADJUSTMENT

1. Make certain load is disconnected. Connect a digital voltmeter across series combination of R359 and R360 or R361 and R362.
2. Adjust the L Channel Bias Adjustment potentiometer R331 for voltmeter reading between 18 mV and 34 mV.
3. Repeat for R Channel.

   Note: A 18 mV drop across the series resistance (R359 and R360 or R361 and R362) represents 30 mA idling current in the output stage. A 34 mV drop represents 57 mA idling current.

Note: AC line voltage must be maintained at 120V at all times and the Wattmeter switched to the DIRECT position during remaining test.

F. MAXIMUM POWER OUTPUT

1. Connect the audio oscillator to the input jacks. Set the audio oscillator frequency to 20 Hz.
2. Connect the distortion analyzer across the L Channel output load (4 ohms), set the analyzer to the 100V AC scale.
3. Set Line Switch to ON. Turn the analyzer and audio generator to ON. Increase the audio oscillator output until the analyzer indicates 34.64V while observing output waveform, which is 300W into 4 ohms. There should be no visible signs of clipping on the waveform. Repeat for 2kHz and 20kHz.
4. Change output load to 8 ohms and readjust the output of the audio oscillator for an output voltage of 45.25V. Set oscillator sequentially to 20 Hz, 2kHz, and 20 kHz. Output voltage should not be less than 45.25 V which is 256 W into 8 ohms.
5. Set Line Switch to OFF. Connect test equipment for R Channel and repeat Steps 1 through 4.

G. HARMONIC DISTORTION TEST

1. Set audio oscillator frequency to 20 Hz and adjust level for 45.25 V into 8 ohms output. Set distortion analyzer to SET LEVEL. Adjust sensitivity for full scale reading on 0-1 scale.
2. Switch distortion analyzer to DISTORTION mode and monitor L Channel output. Total harmonic distortion should be no more than 0.1%.
3. Repeat test for L Channel with audio oscillator frequency set at 20 kHz.
4. Repeat test for L Channel at 20 Hz and 20 kHz with 0.5 mfd capacitor across load. Total harmonic distortion should not exceed 0.1%. Verify absence of parasitic oscillation.
5. Perform Steps 2, 3, and 4 for R Channel.

H. GAIN TEST

1. Apply a 1 kHz signal to the input jack of the L Channel. With unit in an 8 ohm load, adjust the oscillator level for any convenient output voltage (between 20V and 30V), measured at the speaker terminals.
2. Measure the input level. The difference between the input and output signal levels should be 26.26 dB ± 0.5 dB.
3. Repeat for R Channel.

I. GAIN DIFFERENTIAL TEST

1. Apply an identical 1 kHz signal to the inputs of each channel. Set the oscillator level for any convenient output voltage into the 8 ohm load.
2. Verify that both channels have the same output voltage with 0.2 dB.

J. METER CALIBRATION

1. Set the frequency of the audio oscillator to 1 kHz. Connect oscillator to L CHANNEL input jack. Connect analyzer to L CHANNEL loudspeaker terminal.
2. Set the controls of the analyzer for voltage measurement on the 100V AC scale.
3. Set the L CHANNEL METER RANGE Switch to the +20 VU position.
4. Adjust the oscillator output at 1 kHz level until the amplifier output measures 32.0V rms (128W) into an 8-ohm load.
5. Observe L Channel VU meter. The meter should indicate 0 VU. If the meter does not indicate 0 VU, adjust Meter Calibration potentiometer R235 for a 0 VU indication on the meter.
6. Decrease amplitude of oscillator (30V scale) for amplifier output of 10.12 V rms (12.8W) into an 8 ohm load.
7. Set METER RANGE Switch to +10 VU position.
8. Verify VU meter for indication of 0 VU ± 1 VU.
9. Decrease amplitude of oscillator (10 V scale) for amplifier output of 3.2V rms (1.28W) into an 8 ohm load.
10. Set METER RANGE Switch to 0 VU position.
11. Verify VU meter for indication of 0 VU ± 1 VU.
12. Repeat steps 1-11 for test and calibration of R Channel. If calibration is necessary, adjust Meter Calibration potentiometer R236.

K. CHANNEL SEPARATION TEST

1. Apply the output of the audio oscillator to the L Channel input jack. Insert a shorting plug in the R Channel input jack.

2. With the Load Box set for an 8 ohm load, set the oscillator frequency to 20 kHz and the oscillator level (between 20V and 30V), as measured at the speaker terminals.

3. Measure the output voltage of the R Channel and verify that it is 65 dB or more below the level of the driven channel.

4. Repeat test for L Channel output with R Channel driven.

L. TOTAL HUM AND NOISE TEST

1. Connect the voltmeter across the L Channel loudspeaker terminals.

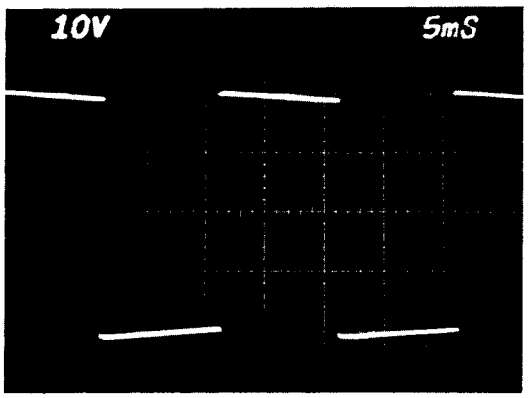
2. With shorting plugs in the output jacks, the meter should display .141 mV or less. (Noise Bandwidth 20 Hz to 20 kHz).

3. Repeat test for R Channel.

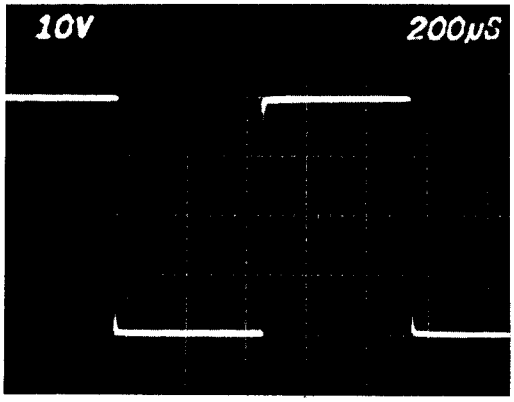
M. FREQUENCY RESPONSE

1. Verify square wave response at 50 Watt level for distortion - free performance (10 V peak-to-peak into 8 ohm load), as shown in Figure 5.

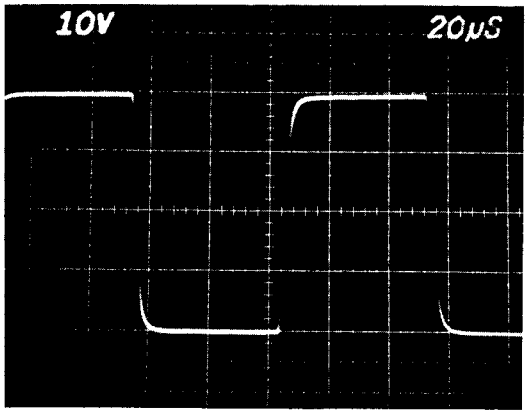
   NOTE: Remove jumper from across R3 Resistor before reassembly.



50 WATTS, 50 Hz



50 WATTS, 1 kHz



50 WATTS, 10 KHz

Figure 5. Square Wave Response

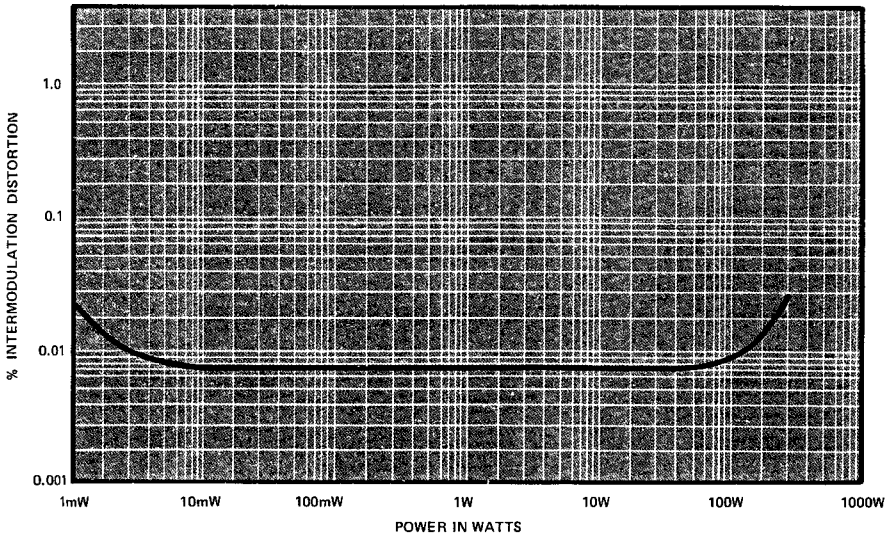


Figure 6A.
Intermodulation Distortion vs Power Output
with 8-ohm resistive load

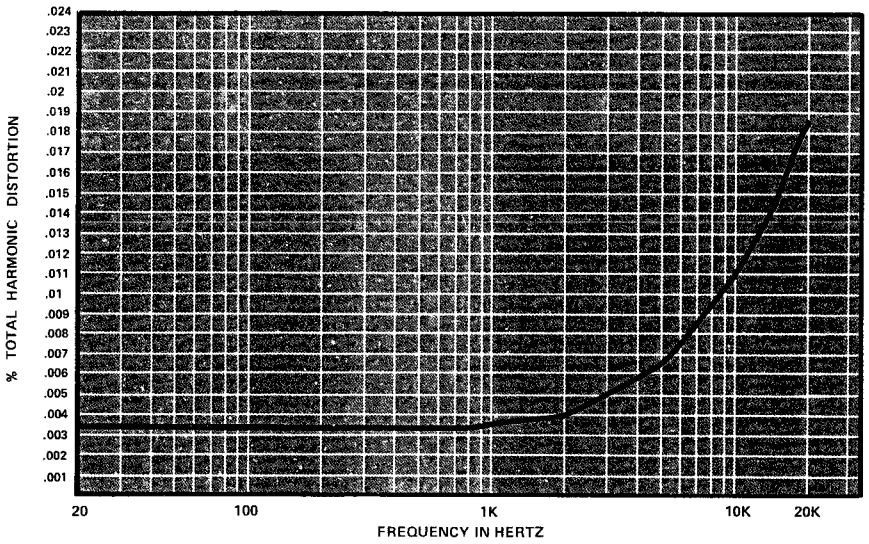


Figure 6B.
Harmonic Distortion
vs Frequency,
1 Watt Output
with 8-ohm resistive load

Figure 6C.
Harmonic Distortion vs Frequency,
256 Watt Output
with 8-ohm resistive load

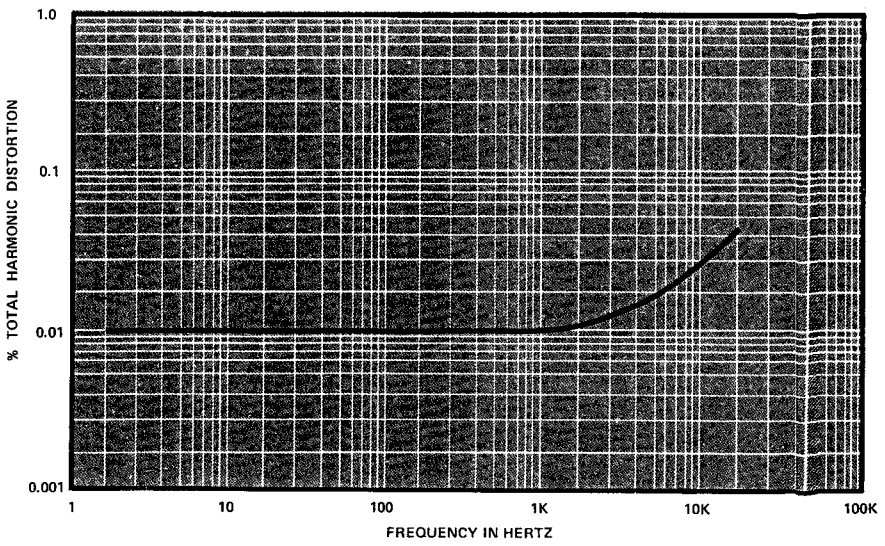


Figure 6. Typical Distortion Measurements

TROUBLE ANALYSIS

This section contains a partial list of possible problems and causes that may be found in a defective unit. It is not the intent of this section to indicate all potential problems and their remedies since the service technician will recognize most of them. It is intended to provide information covering those situations where problems may be difficult to isolate. It is assumed that normal troubleshooting techniques (point-to-point signal tracing, oscilloscope analysis, etc.) will be employed while referring to this section.

All references in this section will be made to Schematic Diagram, Figure 15.

Note: Performance verification is necessary following any repair.

SYMPTOM	PROBABLE CAUSE
1. No Line Consumption:	a) Check fuses F1 (if used) and F2. b) Check AC line cord. c) Check for open R3.* d) Check voltages at C3 and C4. e) Check voltage between CR1 and T1. f) Check for defective transformer T1.
2. No Zero Bias:	a) Check and adjust R331. b) Check Q307 and Q308. c) Check Q401 and associated components. d) Check Q304, Q306, Q303, Q305, and associated components.
CAUTION: Because the driver and output stages are directly coupled, components may fail as a direct result of an initial component failure. If a shorted semiconductor is found, be sure to check the remaining driver and output components for short or open circuits before re-energizing the amplifier. After replacement of any of these components, increase the autotransformer voltage slowly (make certain R3 resistor is shorted before increasing voltage) while monitoring the wattmeter as described in paragraph C of Performance Verification section.	
3. Excessive Line Consumption: (130 watts or more)	a) Check and adjust R331. b) If line consumption cannot be reduced short C306 which will defeat the differential amplifier and its associated circuitry. If excessive line consumption is removed, check Q304 and Q308. If line consumption is not removed proceed to the next item. c) Re-check R331 and associated components. d) Check from Q309 and Q310 to all transistors DC coupled one to the other progressing toward the output stage.
4. High DC Voltage at the Speaker Terminals or No DC Balance:	Short C306, if DC voltage is removed at the speaker terminals check Q304 through Q310.

Table 2. Trouble Analysis

(continued) ——————→

SYMPTOM	PROBABLE CAUSE
5. Parasitic Oscillation:	a) Check C308, C310 through C314, C319, C322, C323, C326, C330, and associated components. b) If oscillation only occurs during clipping into 4 ohms check R363.
6. Hum and Noise:	a) Check for lead dress problem by shorting across the input terminals of the amplifier board. If hum and noise is reduced re-dress input leads. b) Check C3 and C4. c) Check C303, C304 and check Q304 and Q306 for output resistance. It should measure greater than 200 k ohms.
7. Improper Clipping:	a) Check for proper power supply voltages at C3 and C4. b) Check voltages at test points K and L (ref. Schematic Diagram Figure 15). c) Check Q311 and Q312. d) Check Q402 through Q413. e) Check current sharing by measuring voltage drops across R359, R360, R361 and R362 at maximum output power into 4 ohms. f) Check transistors Q402 and Q405 for minimum beta greater than 90 @ 1 A.
8. Defective Soft Start Circuit:	a) Check R3*. b) Check K1 and relay contacts. c) Check C5 and CR2.
9. No Output:	a) Check Q303 and Q305 and associated components. b) If unit is checked and functions properly, instruct customer to check speaker line fuses.
10. High distortion on 4 or 8 ohm loads, yet the amplifier appears in all other cases to be normal:	a) Capacitor C330 has changed value. b) Resistor R363 has opened.
* In some units R3 consists of two 10 ohm resistors in series.	

Table 2. Trouble Analysis (continued)

SERVICE NOTES

This section contains instructions for disassembly and servicing procedures for areas which require special care or whose disassembly/re-assembly methods are not evident. Unless otherwise specified in the text, re-assembly of the unit is accomplished by following the instructions in reverse sequence. For parts breakdown and their reference numbers refer to the Mechanical Exploded View, Figure 9.

A. TOP COVER

1. Remove the fourteen screws (0114) from the outer periphery to the top cover (0201).

Note: If the unit was in operation immediately prior to disassembly, discharge the filter capacitors (C3 and C4) with a 100 Watt light bulb before continuing.

B. AIR FILTER

1. The air filter (0205) located on the bottom-side of the top cover should periodically be vacuum cleaned to remove dust build-up that may clog the filter and retard cooling.

C. HEATSINK ASSEMBLY

1. Remove Top Cover (ref. paragraph A).
2. Place unit on its side and remove the twelve screws (0139) and washers from the bottom-side of the unit that secure the heatsink to the chassis base.

3. Detach all wiring on both modules of Heatsink Assembly. (When re-connecting wiring refer to Wiring Diagram, Figure 16.)
4. Return unit to level position and carefully remove Heatsink Assembly.

D. SIDE PANEL (For Removal of Left Channel Heatsink Module)

If the problem area is in the left channel only, the left module of the Heatsink Assembly can be removed without disassembly of the entire Heatsink Assembly.

1. Remove Top Cover (ref. paragraph A).
2. Remove the two hex bolts (0111) and nuts from the left side of the Front Panel (0301) with a plastic tipped nut driver.
3. Remove the four screws (0114) and (0118) and washers from the left side panel.
4. Set unit on its right side (unit facing front) and remove the four screws (0137) securing side panel to chassis base. Remove side panel.
5. Remove the six screws (0139) and washers securing the left channel module of the Heatsink Assembly to chassis base.
6. Return unit to level position and detach wiring to left channel module.
7. Remove the four screws (0129) and washers securing Heatsink Cover Plate (0412).
8. Remove cover plate and carefully lift left heatsink module out of unit.

E. AMPLIFIER BOARD TEST

The Amplifier Board Assembly may be setup to function as a low power amplifier independent of the output stage of the Model 510 Series enabling the technician to test and isolate problem areas within the predriver circuitry.

1. Remove Top Cover (ref. paragraph A).
2. Remove Heatsink Assembly (ref. paragraph C).
3. Remove the eight screws (0155) and washers securing Amplifier Board Assembly (A200) to the Heatsink-Collector Board Assembly (A300).
4. Carefully pull apart the boards by separating the pin connectors located in the center of the boards.
5. Refering to the Amplifier Board Diagram, Figure 11., attach jumper connections across the following points:
   a) Point "D" to "E" of connector
   b) Point "G" to Amplifier side of either L301 or R364.
   c) Point "H" to Amplifier side of either L301 or R364.
6. Re-connect the positive and negative power supplies to amplifier board.

Caution: When testing the amplifier board in this manner an input signal frequency no higher than 1kHz should be applied to avoid possible damage to the pre-drivers.

F. COLLECTOR BOARD TEST POINTS AND OUTPUT DEVICES

The Collector Board has been designed so that the driver and output transistor junctions are brought together at test points (ref. Collector Board Diagram, Figure 12. for test point locations) to facilitate in isolating defective devices.

1. Remove Top Cover (ref. paragraph A).
2. Remove Heatsink Assembly (ref. paragraph C).
3. Separate Amplifier Board from Heatsink Collector Board Assembly (ref. paragraph E item 1-3).
4. Transistors are removed from the Heatsink-Collector Board Assembly by removing transistor mounting screws (heatsink side), unsoldering leads from Collector Board and pulling transistor out from heatsink.

IMPORTANT:

In the event an output device fails and requires replacement, operating parameters should be checked on all output devices in that channel with a curve tracer.

G. VOLTAGE CONVERSION

Conversion of the Model 510 series will require the following modifications:

1. Replacement of the standard 120V power transformer with a universal power transformer (P/N 440-2015-000) used for 100, 110, 200, 220, 240 VAC operation.
   a) Remove top cover (ref. paragraph A),
   b) Remove the two hex bolts (0111) and nuts from the right side of front panel

of the unit with a plastic tipped nut driver.

c) Remove the four screws (0114 and 0118) and washers from right side panel.

d) Set unit on it's left side (unit facing front) and remove the four screws (0137) securing side panel to chassis base. Remove side panel.

e) Return unit to level position on the edge of the work bench with transformer side of unit extended far enough over, to permit access to the bolts securing transformer to chassis base. Remove the four hex head bolts (0135) and lock washers from chassis base.

f) Detach primary and secondary wiring and remove transformer from unit.

g) Install universal transformer.

2. TERMINAL STRIP TB5

Install additional terminal strip TB5 (P/N 362-2007-000) next to terminal strip TB3. Refer to the Wiring Diagram, Figure 16. for location of TB5 indicated by dotted lines.

a) Remove the rivets securing TB3 with a No. 27 drill bit.

b) Secure both TB3 and TB5 to the chassis base with the following hardware:

2 Screw, 6-32 x 3/8 Pan head black oxide (P/N 741-0612-000)
2 Washer, No. 6 split lock washer (P/N 671-4332-000)
2 Nut, self-retaining (P/N 682-4001-000)

3. WIRING

When installation of the universal transformer and terminal strip TB5 is completed, connect primary, secondary, and jumper wire connections as indicated in the Voltage Conversion Wiring Diagram, Figure 7.

In addition to the noted wire connections some wiring will have to be re-routed when installing the 2-wire AC line cord and installation of internal line fuse that are required on some conversions (refer to Wiring Diagram, Figure 16. for wiring configuration).

4. FUSE REPLACEMENT

When converting the Model 510 series for 120V (CANADA) and 100V (JAPAN) operation, an internal fuse (F1) must be installed. Refer to Wiring Diagram, Figure 16. for fuse location and wiring configuration.

The ampere rating of fuse F1 must correspond to the line voltage. Based on the converted voltage operation, select and install the appropriate fuse by referencing

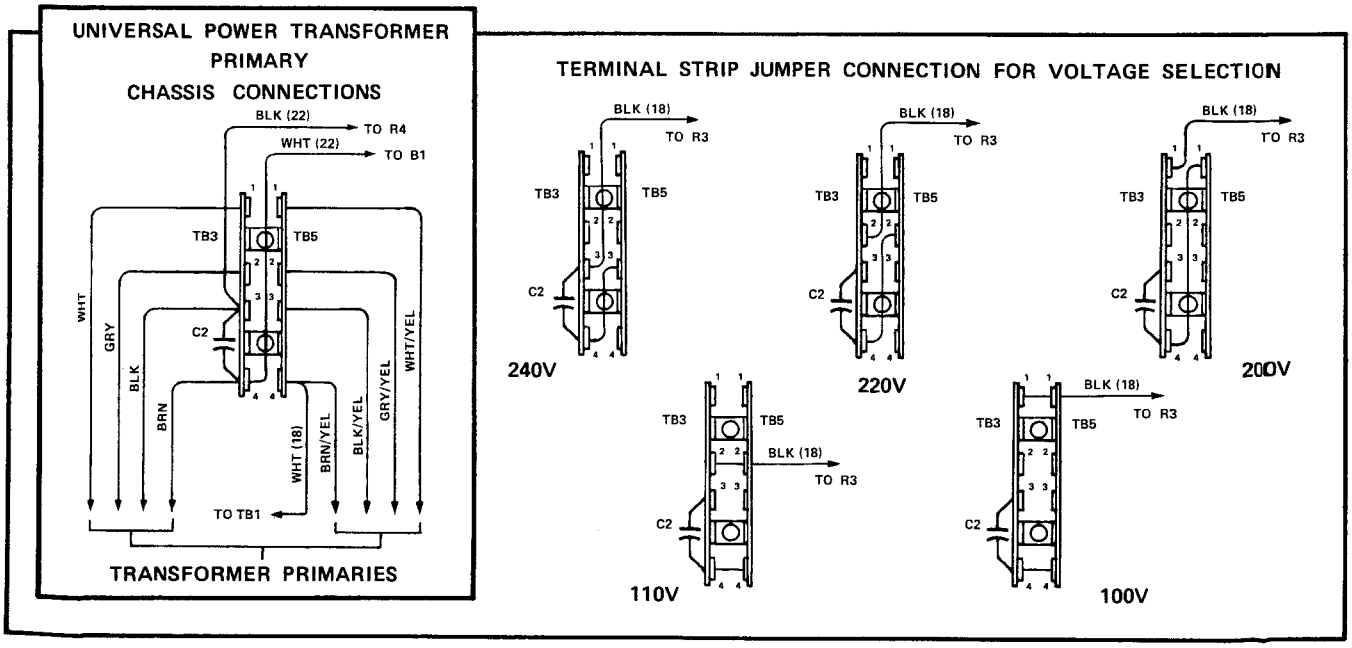


Figure 7. Voltage Conversion Wiring Diagram

the fuse ratings listed in the Schematic Diagram, Figure 15.

H. SPEAKER LINE FUSES

Because of the Model 510 Series power output capabilities and the prospect of inadvertently overpowering a speaker to the point of destruction, it is recommended that speaker line fuses be installed in accordance with the speaker system. Refer to the table for fuse value selection in the Model 510 Series Owners Manual.

I. REPACKING FOR SHIPMENT

Should the unit require repacking for shipment, observe the following precautions:

A. Do not ship the unit with the walnut cabinet installed; remove the unit from the cabinet before packing.

B. Pack the unit carefully, using the original material as shown in Figure 8.

NOTE: If the packing material has been discarded, or damaged, the carton and fillers may be obtained by ordering from the Marantz Parts Department.

C. Ship by a reputable carrier (do not use Parcel Post) and obtain a shipping receipt from the carrier.

D. Insure the unit for its full value.

E. Be sure to include your return address on the shipping label.

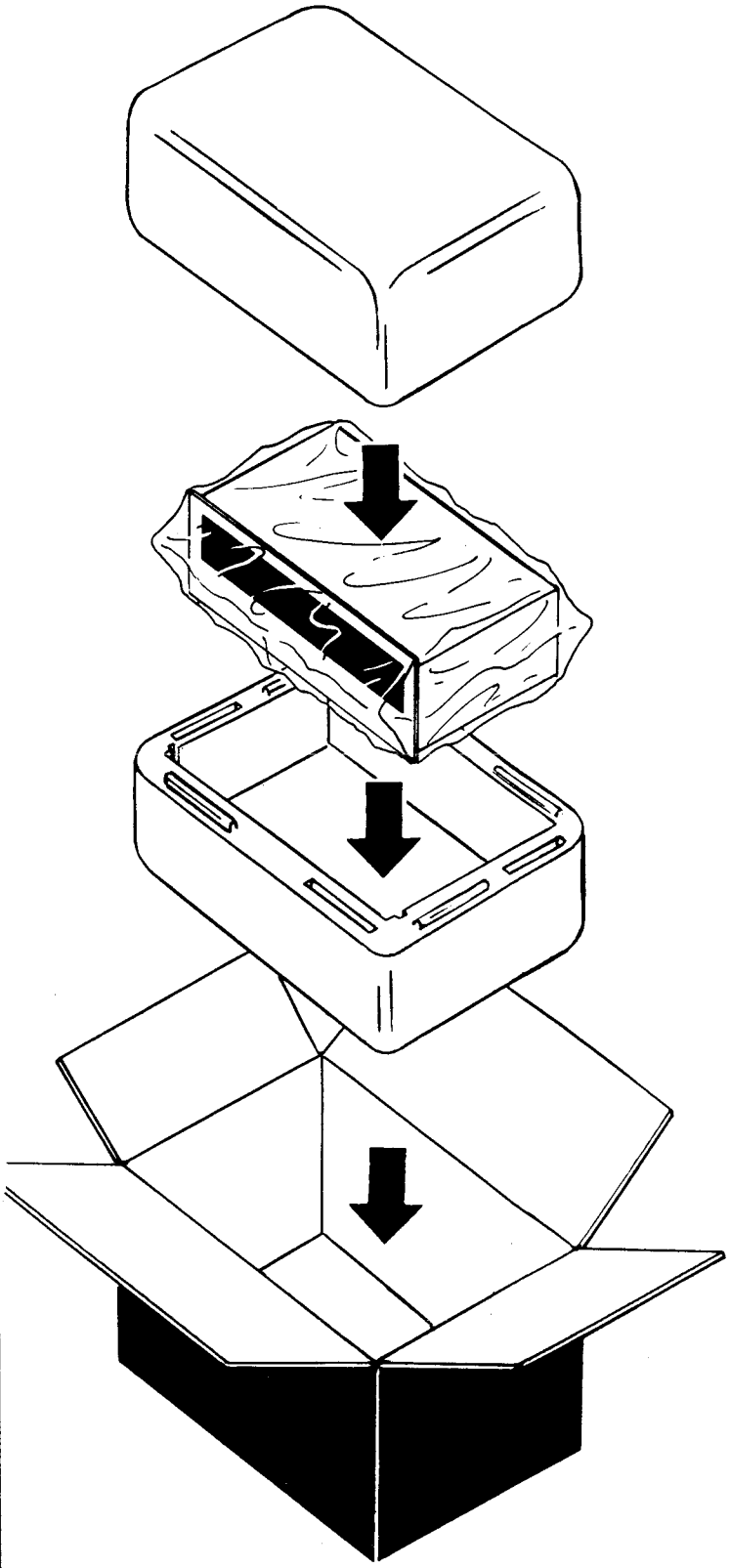


Figure 8. Repacking Diagram

PARTS LIST

PACKING MATERIAL / MISCELLANEOUS

REF. NO.	510	510M	MARANTZ PART NO.	DESCRIPTION
				MISCELLANEOUS
	1	1	197-1002-000	BAG, PLASTIC
	2	2	196-2004-000	INSERT, PACKING, FOAM
	1		195-2002-110	CARTON, INNER (510)
		1	195-2002-120	CARTON, INNER (510M)
	1		195-2002-510	CARTON, OUTER (510)
		1	195-2002-520	CARTON, OUTER (510M)
			199-2015-000	MANUAL, OWNERS
			199-2043-000	MANUAL, SERVICE
			199-2016-000	SCHEMATIC DIAGRAM
			249-2006-100	ACCESSORY KIT

PARTS LIST CHASSIS COMPONENT

REF. NO.	510	510M	MARANTZ PART NO.	DESCRIPTION
				CHASSIS ASSEMBLY
0201	1	1	136-2011-000	COVER, TOP
0202	1	1	136-2016-000	SHIELD, FRONT PANEL
0203	3	4	174-2000-000	KNOB, FUNCTION
0204	4	4	567-2000-000	FOOT, PLASTIC
0205	1	1	540-2001-000	FILTER, AIR
0301	1		206-2006-100	FRONT PANEL ASSEMBLY (510)
0301		1	206-2007-100	FRONT PANEL ASSEMBLY (510M)
0401		4	132-2022-010	BRACKET, METER (510M)
0402	1		133-2021-000	CHASSIS FRONT (510)
0402		1	133-2023-000	CHASSIS FRONT (510M)
0403	1	1	133-2022-010	CHASSIS SIDE (right)
0404	1	1	133-2022-020	CHASSIS SIDE (left)
0405	1	1	133-2031-000	CHASSIS REAR
0405	1	1	133-2032-000	CHASSIS REAR (100V MODELS)
0406	1	1	134-2024-000	CHASSIS BASE
0407	1	1	150-2005-100	STRAP, CAPACITOR
0408	1	1	160-2000-000	GRILLE, FAN
0409	2	2	170-2006-000	LENS, PEAK INDICATOR
0410	3		483-2000-000	SHIELD, LAMP
0411	1	1	127-2003-000	INSULATOR, FAN
0412	1	1	136-2026-000	PLATE, HEATSINK COVER
0413	4	4	664-2000-000	TRIMOUNT, FAN
0414	1	1	136-2027-000	COVER, PEAK OVERLOAD CIRCUIT BOARD
0415	1		170-2002-000	JEWEL, PILOT LIGHT (510)
0416	4	4	365-8630-000	LUG, TERMINAL
0417		4	365-9822-000	TERMINAL, RING 22-16, NO. 10 (510M)
0418	4	4	365-2021-000	TERMINAL, RING, NO. 10
0419	2	2	561-1003-010	CLAMP CAPACITOR
0420	1	1	565-2000-000	BUSHING, AC LINE CORD
0420	1	1	565-2001-000	BUSHING, AC LINE CORD (100V MODELS)
0421	4	4	566-2421-000	GROMMET, FAN MTG
0422	4	4	370-2001-000	SPACER, FAN MTG
0423	3	2	566-2422-000	GROMMET, LAMP MTG
B1	1	1	530-2001-000	FAN
C1,C2	2	2	383-1006-000	CAPACITOR, CERAMIC, .01 MFD. 1400V
C3,C4	2	2	381-4002-000	CAPACITOR, ELECTRO-LYTIC 10K MFD. 100V
C5	1	1	381-2004-000	CAPACITOR, ELECTRO-LYTIC 470 MFD +100% −20% 35V
CR1	1	1	468-2001-000	RECTIFIER, DIODE BRIDGE MDA 990-4
CR2	1	1	460-2000-000	DIODE IN4003
DS1-DS6		6	482-2001-000	LAMP, METER
F1	1	1	451-2008-170	FUSE, 15A, 250V SLO-BLO (EXPORT MODELS ONLY)
F2	1	1	451-2001-160	FUSE, 15A, 250V (120V MODELS)
F2	1	1	451-2001-130	FUSE, 8A, 250V (220V/240V MODELS)
F2	1	1	451-2007-330	FUSE, 15A, 250V NORMAL BLOW (100V MODELS)
F2	1	1	451-2001-150	FUSE, 12A (120V CANADA)
F201	1	1	451-2007-070	FUSE, 2A (100V MODELS)
	1	1	367-2002-000	HOLDER, FUSE (F1 EXPORT MODELS)
XF01	1	1	367-1000-000	HOLDER, FUSE WITH MTG HARDWARE
XF01	1	1	367-2004-000	HOLDER, FUSE WITH MTG HARDWARE (100V MODELS)
J1,J2	2	2	360-1017-000	JACK, INPUT
J4A, J4B	2	2	359-1003-000	BINDING POST, SPEAKER
	1	1	363-2000-000	TERMINAL BLOCK, SPEAKER (100V MODELS)
K1	1	1	410-2002-000	RELAY, DPDT
M1,M2		2	865-2003-000	METER, VU (510M)
P1	1	1	361-2002-000	CORD LINE, AC (3-WIRE)
P1	1	1	361-2003-000	CORD, LINE, AC (100V MODELS)
R1,R2	2	2	420-2015-000	RESISTOR, VARIABLE, 35K GAIN CONTROL
R3	1	1	439-2010-000	RESISTOR, 10 OHM 10W 10% W/W
R3	1	1	439-2009-000	RESISTOR, 20 OHM 20W ± 10% W/W (200V, 220, 240V MODELS)
R4	1	1	439-2008-040	RESISTOR, 380 OHM 15W 5% W/W
R5	1	1	428-3702-000	RESISTOR, 700 OHM 5W 5% W/W
S1	1	1	453-2015-000	SWITCH, POWER, WITH MTG HARDWARE
T1	1	1	440-2014-000	TRANSFORMER, POWER
T1	1	1	440-2015-000	TRANSFORMER, POWER (EXPORT MODELS)
TB1, TB2	2	2	362-2008-000	TERMINAL STRIP
TB3, TB5	1	1	362-2007-000	TERMINAL STRIP (TB5 EXPORT MODELS)
TB4	1	1	362-2009-000	TERMINAL STRIP
TB6	1	1	362-2010-000	TERMINAL STRIP
0110	4	4	689-2003-000	NUT, 5mm 0.80P
0111	4	4	769-2010-000	BOLT, DRESS, HEX
0112	3	4	775-3242-000	SCREW, SET, KNOB 8-32 x 1/4 BLK
0113			784-7132-000	SCREW, THD FORMING, 6-32 x 7/16 PAN HD BLK
0114			784-4112-000	SCREW, THD FORMING, 6-32 x 1/4 PAN HD BLK
0115			673-5322-000	WASHER, NO. 8 EXT LOCK, BLK

REF. NO.	510	510M	MARANTZ PART NO.	DESCRIPTION
0116			751-1012-000	SCREW, MACH 8-32 x 5/8 BLK
0118			751-0412-000	SCREW, PAN HD, 8-32 x 1/4 BLK
0119			671-5452-000	WASHER, NO. 8 LOCK, BLK.
0120			761-0812-000	SCREW, PAN HD CRS RECESS, 10-32 x 1/2 BLK
0121			680-8727-000	NUT, HEX, 3/8-32, BLK
0122			671-6560-000	WASHER, LOCK NO. 10, S/S CAD
0123			671-4332-000	WASHER, LOCK NO. 6, S/S BLK
0124			676-2000-000	WASHER, NO. 6 FIBER
0125			670-4622-000	WASHER, FLAT NO. 6, BLK
0126			680-4332-000	NUT, HEX, 6-36 BLK
0127			680-8726-000	NUT, HEX, 3/8-32
0128			741-3212-000	SCREW, PAN HD , 6-32 x 2 BLK
0129			741-0412-000	SCREW, PAN HD, 6-32 x 1/4 BLK
0130			689-1021-000	NUT, TINNERMAN, U-TYPE
0131			799-1011-000	SCREW, Z PAN, 6-20 x 1/2 BLK
0132			799-2000-000	SCREW, Z PAN, 6-20 x 3/4 BLK
0133			741-1612-000	SCREW, PAN HD, 6-32 x 1 BLK
0134			675-2002-000	WASHER, INTR T LOCK, 3/8
0135			769-1011-000	BOLT, HEX HD CAP, 1/4-20 x 5/8 BLK
0136			761-0612-000	SCREW, PAN HD, CRS RECESS, 10-32 x 3/8 BLK
0137			784-6922-000	SCREW, THD FORMING HEX WSHR, 6-32 x 3/8 BLK
0138			741-0612-000	SCREW, PAN HD, 6-32 x 3/8 BLK
0139			741-0812-000	SCREW, MACH PAN HD , 6-32 x 1/2 BLK
0140			680-6540-000	NUT, HEX, 10-32, CAD
0141			670-5532-000	WASHER, FLAT, NO. 8 BLK OXIDE
0142			675-2003-000	WASHER, LOCK, FLAT
0143			680-5442-000	NUT, 8-32, BLK OXIDE
0144			671-5432-000	WASHER, NO. 8 LOCK, S/S
0145			672-8716-000	WASHER, INTR T LOCK, 3/8
0146			670-8932-000	WASHER, FLAT, 3/8 BLK
0147			673-6610-000	WASHER, NO. 10 EXT LOCK

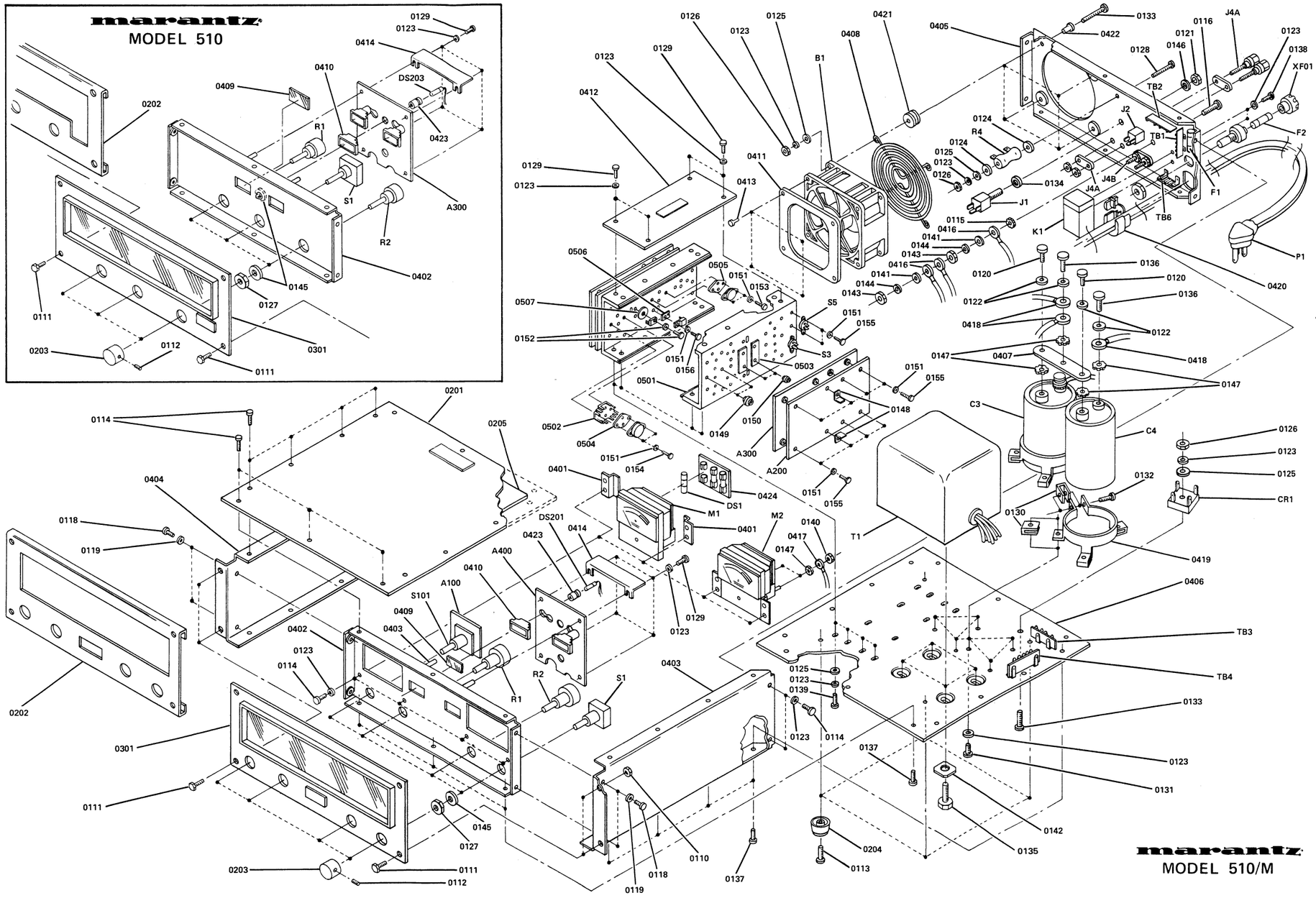


Figure 9. Mechanical Exploded View Diagram

PARTS LIST AMPLIFIER BOARD ASSEMBLY

REF. NO.	510	510M	MARANTZ PART NO.	DESCRIPTION
A200	**2**	**2**	**200-2022-100**	**AMPLIFIER BOARD COMPONENT ASSEMBLY**
C301			381-3001-000	CAPACITOR, ELECTROLYTIC, 4.7 MFD +100% −20% 25V
C302			385-6102-160	CAPACITOR, MICA, 100 PF ± 10% 100V
C303, C304			381-3014-000	CAPACITOR, ELECTROLYTIC, 100 MFD +100% − 20% 25V
C305			385-6152-150	CAPACITOR, MICA, 150 PF ± 5% 100V
C306			381-3009-000	CAPACITOR, ELECTROLYTIC, 47 MFD +100% −20% 25V
C307			381-3013-000	CAPACITOR, ELECTROLYTIC, 22 MFD +100% −20% 10V
C308			385-6202-150	CAPACITOR, MICA, 200 PF ± 5% 100V
C309			381-3012-000	CAPACITOR, ELECTROLYTIC, 330 MFD +100% −20% 6.3V
C310			385-6112-150	CAPACITOR, MICA, 110 PF ± 5% 100V
C311			386-2005-000	CAPACITOR, POLYESTER, 0.22 MFD ±10% 100V
C312			385-6822-350	CAPACITOR, MICA, 820 PF ± 5% 300V
C313, C314			385-6152-150	CAPACITOR, MICA, 150 PF ± 5% 100V
C315, C316			386-2015-000	CAPACITOR, POLYESTER, 0.01 MFD ±10% 400V
C317 THRU C319			386-2014-000	CAPACITOR, POLYESTER, 0.1 MFD ±10% 250V
C320, C321			381-3002-000	CAPACITOR, ELECTROLYTIC, 10 MFD +100% −20% 16V
C322			386-2014-000	CAPACITOR, POLYESTER, 0.1 MFD ±10% 250V
C323			385-6752-350	CAPACITOR, MICA, 750 PF ± 5% 300V
C324, C325			381-3011-000	CAPACITOR, ELECTROLYTIC, 100 MFD +100% −20% 16V
C326			385-6752-350	CAPACITOR, MICA, 750 PF ±5% 300V
C327			386-2014-000	CAPACITOR, POLYESTER, 0.1 MFD ± 10% 250V
C328			386-2006-000	CAPACITOR, POLYESTER, 0.047 MFD ± 10% 100V
C329			386-2014-000	CAPACITOR, POLYESTER, 0.1 MFD ± 10% 250V
C330			386-2019-000	CAPACITOR, POLYESTER, 0.1 MFD ± 10% 400V
CR301, CR302			459-2001-000	DIODE, ZENER IN967, 18V 20%
CR303, CR304			460-2004-000	DIODE, A106
CR305, CR306			460-2000-000	DIODE, POWER IN4003
CR307 THRU CR310			460-2002-000	DIODE, SWITCHING, IN4148
CR311 THRU CR314			460-2000-000	DIODE, POWER, IN4003
L301			390-2002-000	CHOKE, O.P. 2 mH
Q301			461-2001-000	TRANSISTOR, PNP, 2N4250
Q302			462-2002-000	TRANSISTOR, NPN, 2N5210
Q304 THRU Q306			462-2014-000	TRANSISTOR, NPN, MPSL01
			562-1007-000	RETAINER, THERMAL (2 USED FOR Q304 AND Q306)
Q307 THRU Q309			461-2003-000	TRANSISTOR, PNP, 2N5415
Q310			462-2016-000	TRANSISTOR, NPN, 2N3440
Q311			462-2015-000	TRANSISTOR, NPN, MPSA20
Q312			461-2007-000	TRANSISTOR, PNP, MPSA70
Q313			462-2016-000	TRANSISTOR, NPN, 2N3440
Q314			461-2003-000	TRANSISTOR, PNP, 2N5415
			RESISTOR VALUES ARE IN OHMS ± 5% 1/4W AND CARBON-FILM TYPE UNLESS OTHERWISE SPECIFIED.	
R301			434-3512-000	RESISTOR, 510
R302			434-6272-000	RESISTOR, 270K
R303			434-4622-000	RESISTOR, 6.2K
R304			439-2005-010	RESISTOR, 4.3K 2W M/F
R305			434-4562-000	RESISTOR, 5.6K
R306			434-2752-000	RESISTOR, 75
R307			439-2005-010	RESISTOR, 4.3K 2W M/F
R308			434-6362-000	RESISTOR, 360K
R309			434-5512-000	RESISTOR, 51K
R310			420-2014-030	RESISTOR, VARIABLE, 20K ± 20%
R311			434-5512-000	RESISTOR, 51K
R312			434-5202-000	RESISTOR, 20 K
R313			434-6102-000	RESISTOR, 100K

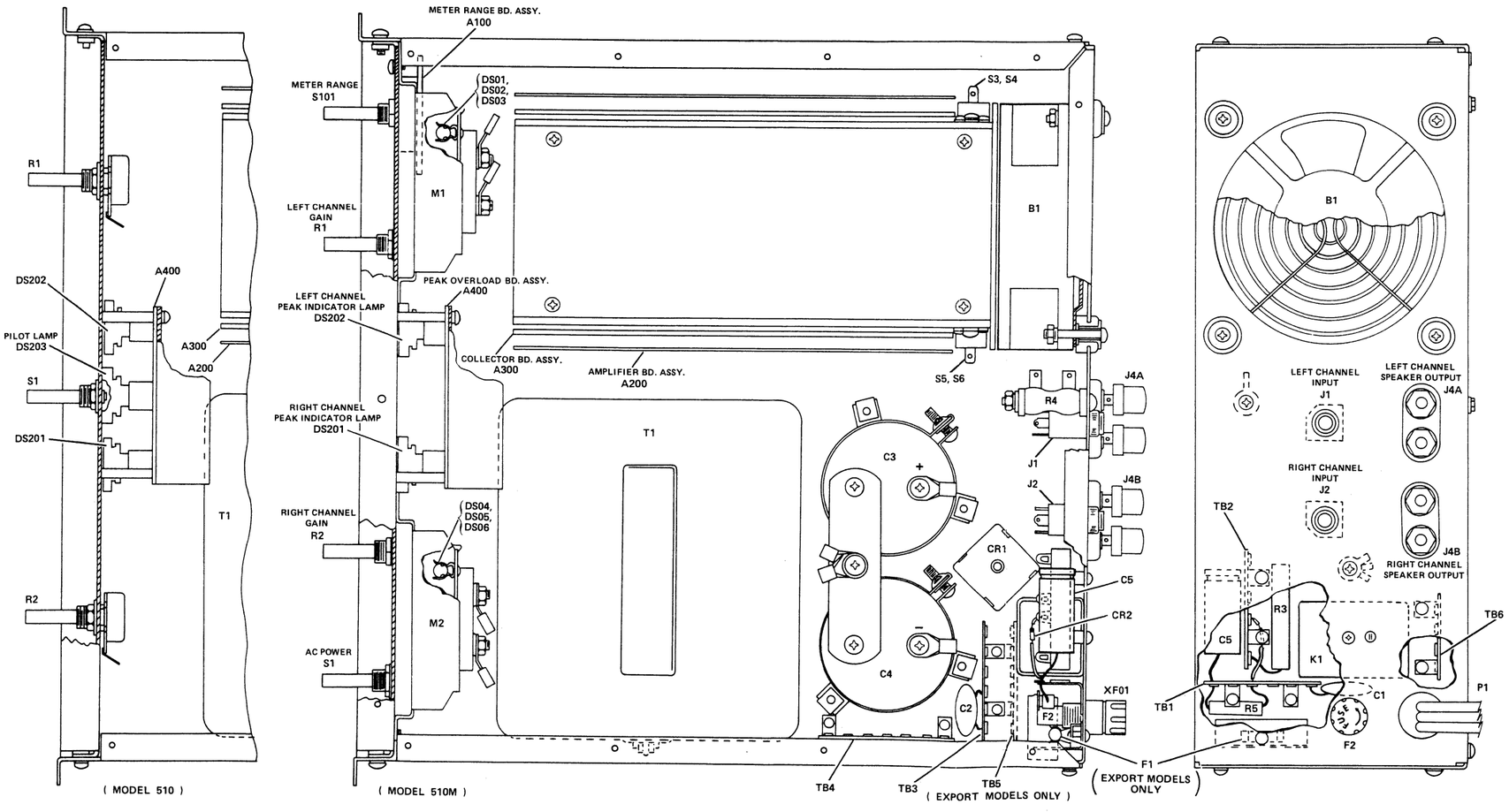
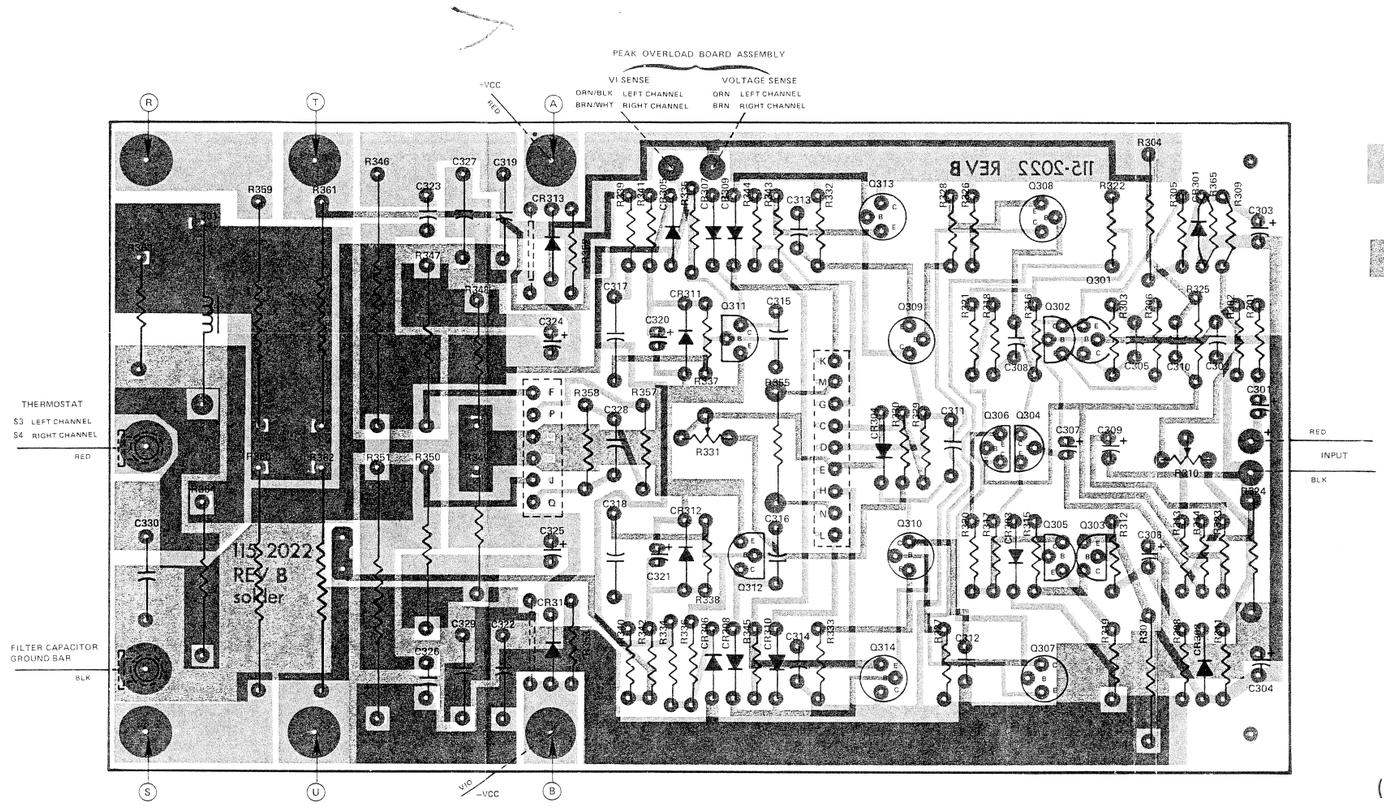


Figure 10. Chassis Component Location Diagram

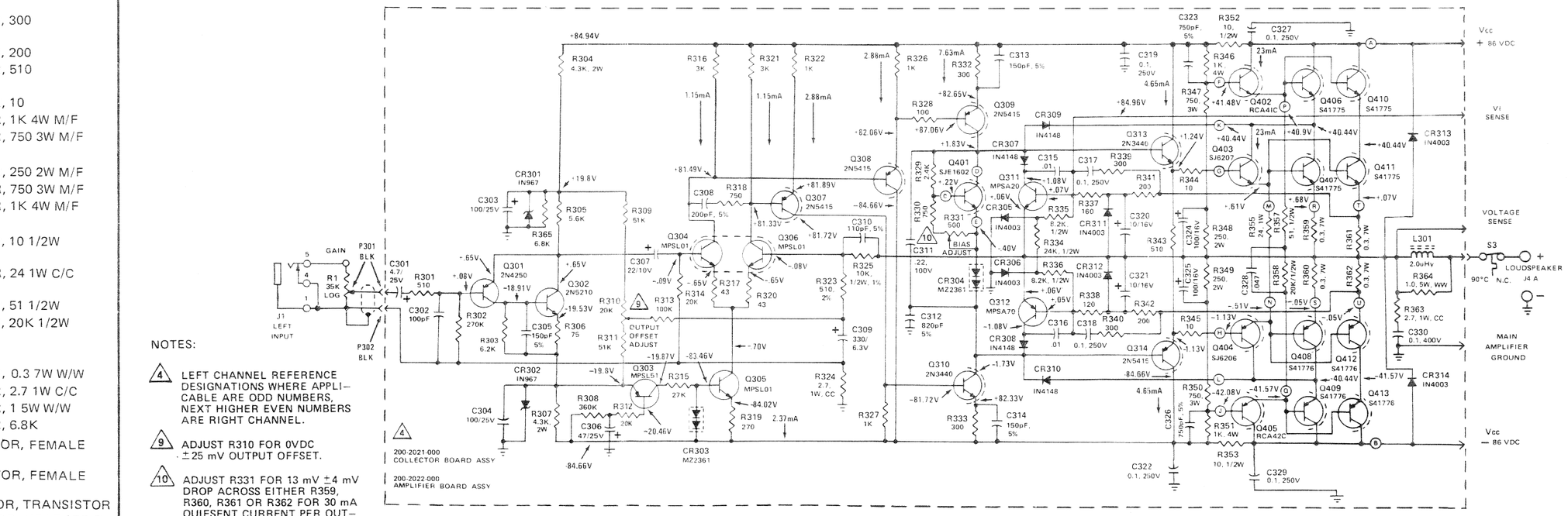
REF. NO.	510	510M	MARANTZ PART NO.	DESCRIPTION
R314			434-5202-000	RESISTOR, 20K
R315			434-5272-000	RESISTOR, 27K
R316			434-4302-000	RESISTOR, 3K
R317			434-2432-000	RESISTOR, 43
R318			434-3752-000	RESISTOR, 750
R319			434-3272-000	RESISTOR, 270
R320			434-2432-000	RESISTOR, 43
R321			434-4302-000	RESISTOR, 3K
R322			434-4102-000	RESISTOR, 1K
R323			439-2004-010	RESISTOR, 510 ±2% 1/4 W M/F
R324			423-1272-000	RESISTOR, 2.7 1W C/C
R325			439-2003-010	RESISTOR, 10K ±1% 1/2 W M/F
R326			434-4102-000	RESISTOR, 1K
R327			434-4102-000	RESISTOR, 1K
R328			434-3122-000	RESISTOR, 120
R329			434-4242-000	RESISTOR, 2.4K
R330			434-3752-000	RESISTOR, 750
R331			420-2014-020	RESISTOR, VARIABLE, BIAS ADJUST 500 ± 20% 1/4W
R332, R333			434-3302-000	RESISTOR, 300
R334			433-5242-000	RESISTOR, 24K 1/2W
R335, R336			433-4822-000	RESISTOR, 8.2K 1/2W
R337			434-3162-000	RESISTOR, 160
R338			434-3122-000	RESISTOR, 120
R339, R340			434-3302-000	RESISTOR, 300
R341, R342			434-3202-000	RESISTOR, 200
R343			434-3512-000	RESISTOR, 510
R344, R345			434-2102-000	RESISTOR, 10
R346			439-2002-010	RESISTOR, 1K 4W M/F
R347			439-2001-010	RESISTOR, 750 3W M/F
R348, R349			439-2005-020	RESISTOR, 250 2W M/F
R350			439-2001-010	RESISTOR, 750 3W M/F
R351			439-2002-010	RESISTOR, 1K 4W M/F
R352, R353			433-2102-000	RESISTOR, 10 1/2W
R354			(NOT USED)	
R355			423-2242-000	RESISTOR, 24 1W C/C
R356			(NOT USED)	
R357			433-2512-000	RESISTOR, 51 1/2W
R358			433-5202-000	RESISTOR, 20K 1/2W
R359 THRU R362			437-0302-000	RESISTOR, 0.3 7W W/W
R363			423-1272-000	RESISTOR, 2.7 1W C/C
R364			428-1102-000	RESISTOR, 1 5W W/W
R365			434-4682-000	RESISTOR, 6.8K
			360-2013-060	CONNECTOR, FEMALE 6-PIN
			360-2013-090	CONNECTOR, FEMALE 9-PIN
			372-1000-000	INSULATOR, TRANSISTOR
			562-1000-000	DISSIPATOR, HEAT (TO-5)



Amplifier Board — Foil Pattern - Component Side

Amplifier Board — Foil Pattern - Circuit Side

(CIRCUIT SIDE SHOWN)



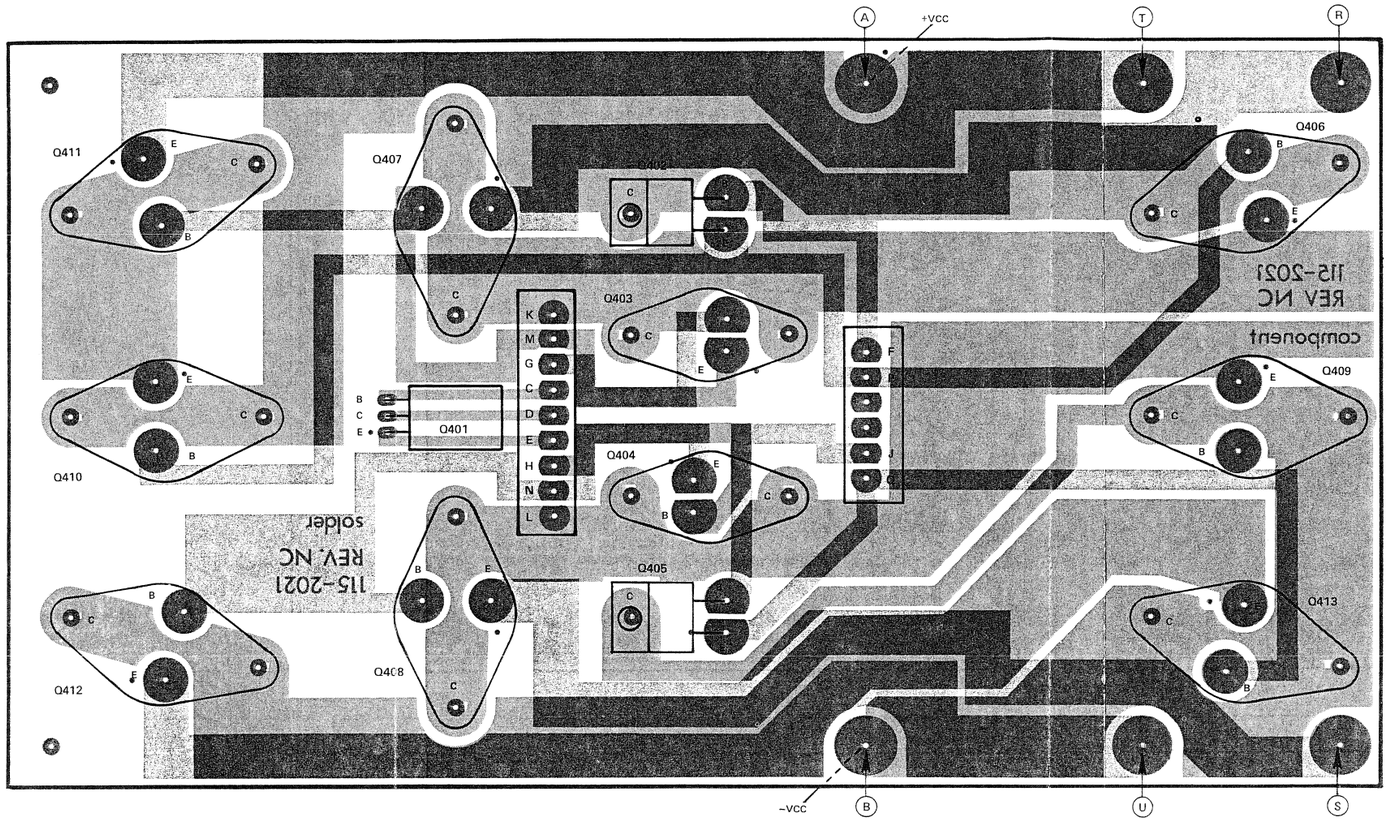
NOTES:

4 LEFT CHANNEL REFERENCE DESIGNATIONS WHERE APPLICABLE ARE ODD NUMBERS, NEXT HIGHER EVEN NUMBERS ARE RIGHT CHANNEL.

9 ADJUST R310 FOR 0VDC ±25 mV OUTPUT OFFSET.

10 ADJUST R331 FOR 13 mV ±4 mV DROP ACROSS EITHER R359, R360, R361 OR R362 FOR 30 mA QUIESENT CURRENT PER OUTPUT TRANSISTOR.

Figure 11. Power Amplifier Board Assembly Diagram



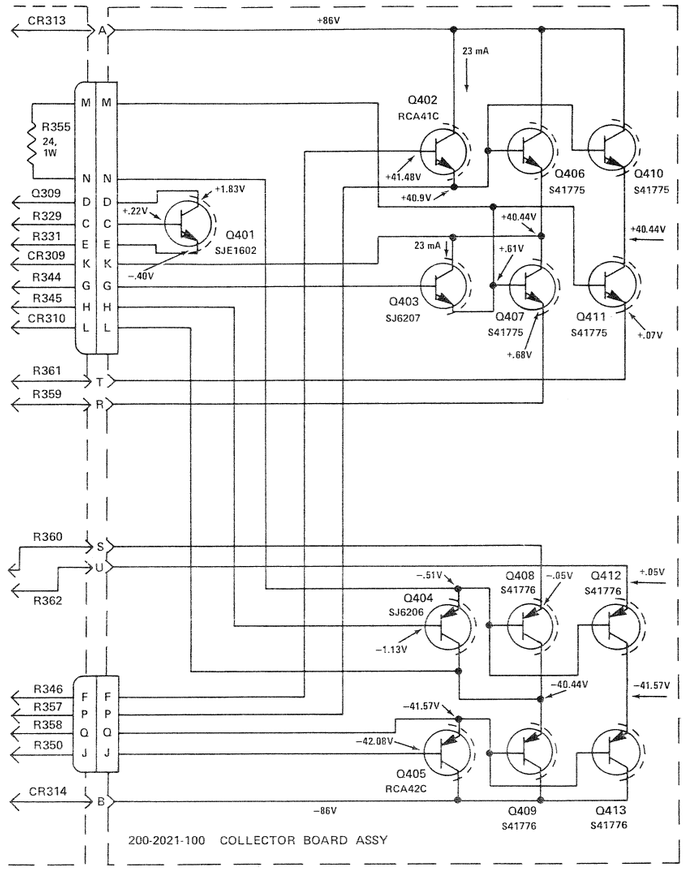


Figure 12. Collector Board Assembly Diagram

Collector Board — Foil Pattern - Component Side

Collector Board — Foil Pattern - Circuit Side

(CIRCUIT SIDE SHOWN)

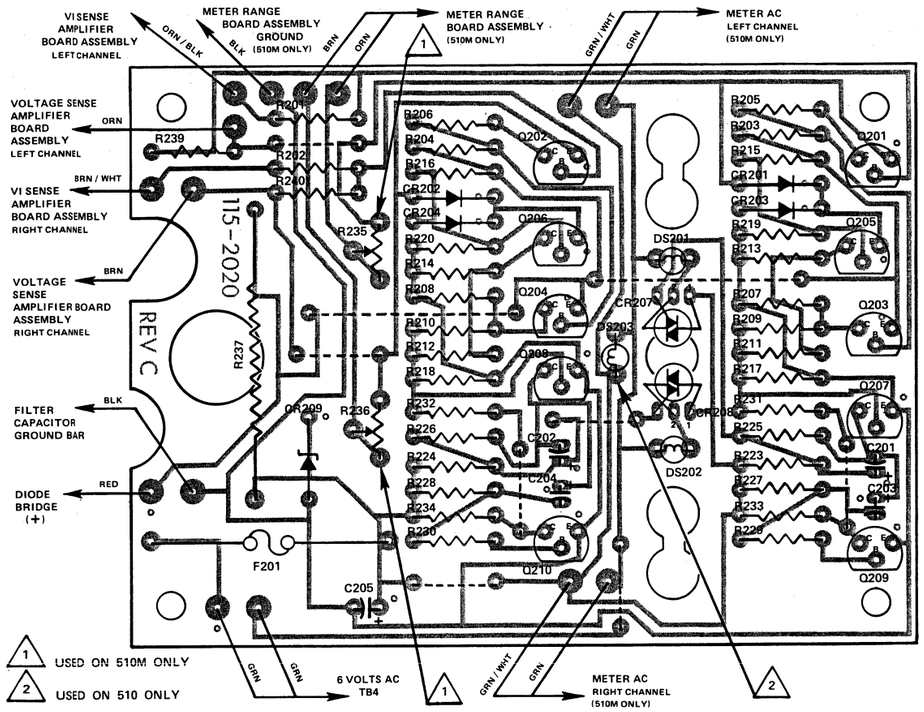
PARTS LIST COLLECTOR BOARD - HEATSINK ASSEMBLY

REF. NO.	510	510M	MARANTZ PART NO.	DESCRIPTION
A300	1	1	200-2021-100	COLLECTOR BOARD COMPONENT ASSEMBLY
0148			365-2020-000	TERMINAL, L SHAPED
0149			176-2000-010	WASHER, SHOULDER
0150			176-2000-020	WASHER, SHOULDER
0151			671-4330-000	WASHER, NO. 6 LOCK S/S CAD
			360-2012-060	CONNECTOR, MALE 6-PIN
			360-2012-090	CONNECTOR, MALE 9-PIN

REF. NO.	510	510M	MARANTZ PART NO.	DESCRIPTION
	2	2	215-2000-100	HEATSINK ASSEMBLY
0501	2	2	141-2005-000	HEATSINK
0502	16	16	562-2001-000	DISSIPATOR, HEAT 1¼"
Q401	2	2	462-1067-020	TRANSISTOR, BIAS NPN MJE180 CASE 77 WITH MTG HDWR
Q402	2	2	462-2007-100	TRANSISTOR, NPN RCA4IC TO-220
Q402	2	2	462-2007-000	TRANSISTOR, NPN, RCA4IC TO-220 (100V MODELS)
Q403	2	2	462-2008-000	TRANSISTOR, NPN, SJ6207 TO-66
Q404	2	2	461-2004-000	TRANSISTOR, PNP, SJ6206 TO-66
Q405	2	2	461-2005-100	TRANSISTOR, PNP, RCA42C TO-220

REF. NO.	510	510M	MARANTZ PART NO.	DESCRIPTION
Q405	2	2	461-2005-000	TRANSISTOR, PNP, RCA42C TO-220 (100V MODELS)
Q406	8	8	462-2009-000	TRANSISTOR, NPN, S41775 TO-3
Q407			462-2009-000	TRANSISTOR, NPN, S41775 TO-3
Q408			461-2006-000	TRANSISTOR, PNP, S41776 TO-3
Q409			461-2006-000	TRANSISTOR, PNP, S41776 TO-3
Q410			462-2009-000	TRANSISTOR, NPN, S41775 TO-3
Q411			462-2009-000	TRANSISTOR, NPN, S41775 TO-3
Q412			461-2006-000	TRANSISTOR, PNP, S41776 TO-3
Q413			461-2006-000	TRANSISTOR, PNP, S41776 TO-3

REF. NO.	510	510M	MARANTZ PART NO.	DESCRIPTION
0503			127-2009-000	INSULATOR, CONNECTOR
0504			371-2004-000	INSULATOR, MICA TO-3
0505			371-2005-000	INSULATOR, MICA TO-66
0506			371-2006-000	INSULATOR, MICA TO-220
0507			371-2003-000	INSULATOR, MICA CASE 77
0152			721-0512-000	SCREW, PAN HD, 4-40 × 5/16 BLK
0153			741-0810-000	SCREW, PAN HD, 6-32 × 1/2 CAD
0154			741-1010-000	SCREW, PAN HD, 6-32 × 5/8 CAD
0155			741-0410-000	SCREW, PAN HD, 6-32 × 1/4 CAD
0156			741-0910-000	SCREW, PAN HD, 6-32 × 9/16 CAD
S3,S4	2	2	491-2002-010	THERMOSTAT (N.C.)
S5,S6	2	2	491-2002-020	THERMOSTAT (N.O.)


VISENSE AMPLIFIER BOARD ASSEMBLY LEFT CHANNEL
METER RANGE BOARD ASSEMBLY GROUND (510M ONLY)
METER RANGE BOARD ASSEMBLY (510M ONLY)
METER AC LEFT CHANNEL (510M ONLY)
VOLTAGE SENSE AMPLIFIER BOARD ASSEMBLY LEFT CHANNEL
VI SENSE AMPLIFIER BOARD ASSEMBLY RIGHT CHANNEL
VOLTAGE SENSE AMPLIFIER BOARD ASSEMBLY RIGHT CHANNEL
FILTER CAPACITOR GROUND BAR
DIODE BRIDGE (+)
115-2020
REV C
1 USED ON 510M ONLY
2 USED ON 510 ONLY
6 VOLTS AC T84
METER AC RIGHT CHANNEL (510M ONLY)

(CIRCUIT SIDE SHOWN)

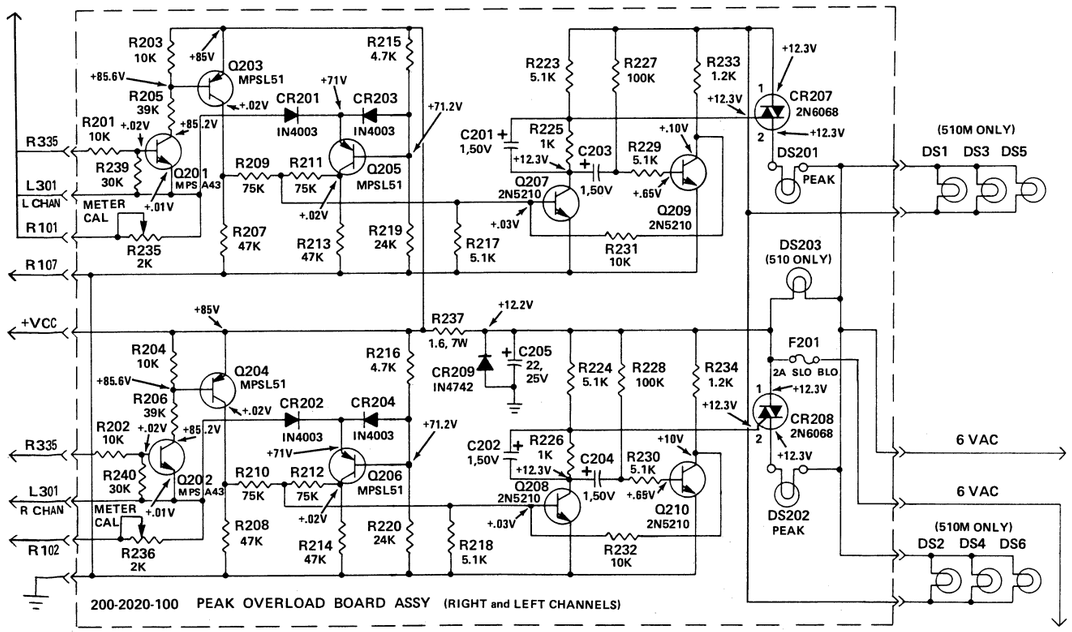


Figure 13. Peak Overload Board Assembly Diagram

PARTS LIST

PEAK OVERLOAD BOARD ASSEMBLY

REF. NO.	510	510M	MARANTZ PART NO.	DESCRIPTION
A400		1	200-2020-100	PEAK OVERLOAD BOARD ASSEMBLY
A400	1		200-2020-200	PEAK OVERLOAD BD ASSY
C201 THRU C204			381-3000-000	CAPACITOR, ELECTROLYTIC, 1 MFD +100% −20% 50V
C205			381-3003-000	CAPACITOR, ELECTROLYTIC, 22 MFD +100% −20% 25V
CR201 THRU CR204			460-2000-000	DIODE, POWER, IN4003
CR205, CR206			(NOT USED)	
CR207, CR208			460-2003-000	DIODE, TRIAC, 2N6068
CR209			459-2003-000	DIODE, ZENER, IN4742, 12V 1W 10%
DS201, DS202	2	2	482-2005-000	LAMP, 6.3V
DS203	1		482-2006-000	LAMP, 6.3V (510)
0423	3	2	566-2422-000	GROMMET, LAMP MOUNTING
F201	1	1	451-2002-220	FUSE, 2A 125V SLO-BLO
F201	1	1	451-2007-070	FUSE, 2A NORMAL BLOW (100V MODELS)
Q201, Q202			462-2017-000	TRANSISTOR, NPN, MPSA43
Q203 THRU Q206			461-2008-000	TRANSISTOR, PNP, MPSL51
Q207 THRU Q210			462-2002-000	TRANSISTOR, NPN, 2N5210
			RESISTOR VALUES ARE IN OHMS ± 5% 1/4W AND CARBON-FILM TYPE UNLESS OTHERWISE SPECIFIED.	
R201 THRU R204			434-5102-000	RESISTOR, 10K
R205, R206			434-5392-000	RESISTOR, 39K
R207, R208			434-5472-000	RESISTOR, 47K
R209 THRU R212			434-5752-000	RESISTOR, 75K
R213, R214			434-5472-000	RESISTOR, 47K
R207, R216			434-4472-000	RESISTOR, 4.7K

(continued)

PARTS LIST

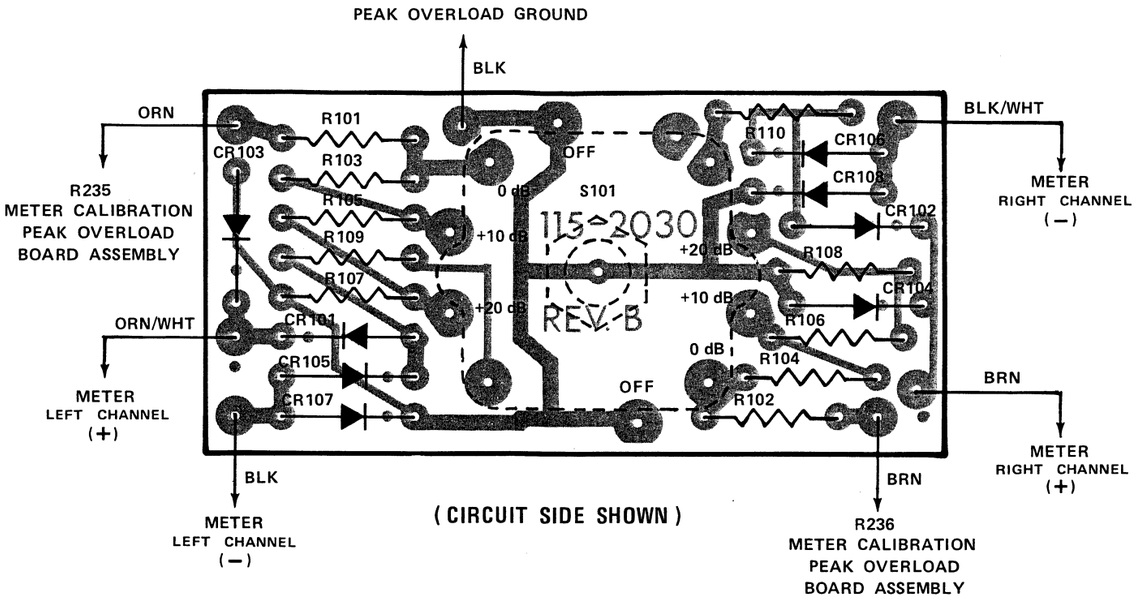
PEAK OVERLOAD BOARD ASSEMBLY (cont'd)

REF. NO.	510	510M	MARANTZ PART NO.	DESCRIPTION
				RESISTOR VALUES ARE IN OHMS ± 5% 1/4W AND CARBON-FILM TYPE UNLESS OTHERWISE SPECIFIED.
R217, R218			434-5212-000	RESISTOR, 5.1K
R219, R220			434-5242-000	RESISTOR, 24K
R221, R222			(NOT USED)	
R223, R224			434-4512-000	RESISTOR, 5.1K
R225, R226			434-4102-000	RESISTOR, 1K
R227, R228			434-6102-000	RESISTOR, 100K
R229, R230			434-4512-000	RESISTOR, 5.1K
R231, R232			434-5102-000	RESISTOR, 10K
R233, R234			434-4122-000	RESISTOR, 1.2K
R235, R236		2	420-2014-010	RESISTOR, VARIABLE, METER CALIBRATION 2K ± 20% (510M)
R237			437-4162-000	RESISTOR, 1.6K 7W W/W
R238			(NOT USED)	
R239, R240			434-5302-000	RESISTOR, 30K

PARTS LIST

METER RANGE BOARD ASSEMBLY

REF. NO.	510	510M	MARANTZ PART NO.	DESCRIPTION
A100		1	200-2030-100	METER RANGE BOARD ASSEMBLY
CR101 THRU CR108		8	460-2001-000	DIODE, RECTIFIER, IN270
				RESISTOR VALUES ARE IN OHMS ± 5% 1/4W AND CARBON-FILM TYPE UNLESS OTHERWISE SPECIFIED.
R101, R102		2	434-4301-000	RESISTOR, 3K ± 2%
R103, R104		2	434-4181-000	RESISTOR, 1.8K ± 2%
R105, R106		2	434-3561-000	RESISTOR, 560 ±2%
R107, R108		2	434-3241-000	RESISTOR, 240 ± 2%
R109, R110		2	434-4331-000	RESISTOR, 3.3K ± 2%
S101		1	453-2014-000	SWITCH, METER RANGE



(CIRCUIT SIDE SHOWN)

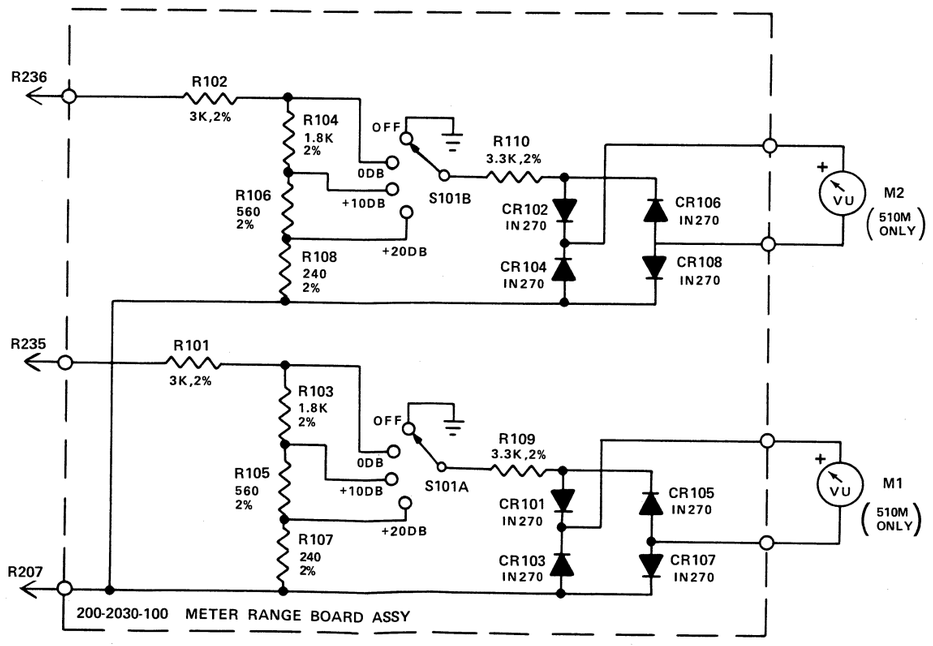


Figure 14. Meter Range Board Assembly Diagram

marantz®

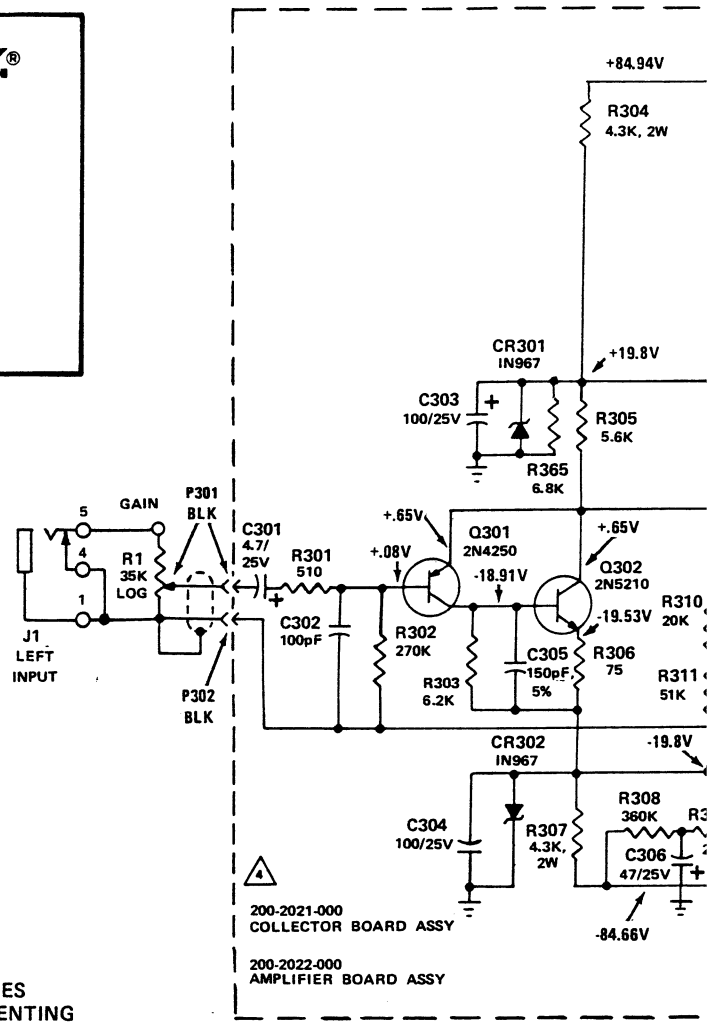
Model 510/M

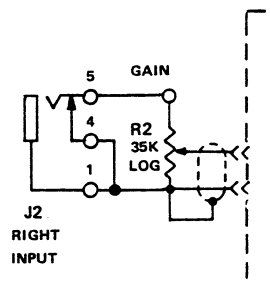
POWER AMPLIFIER

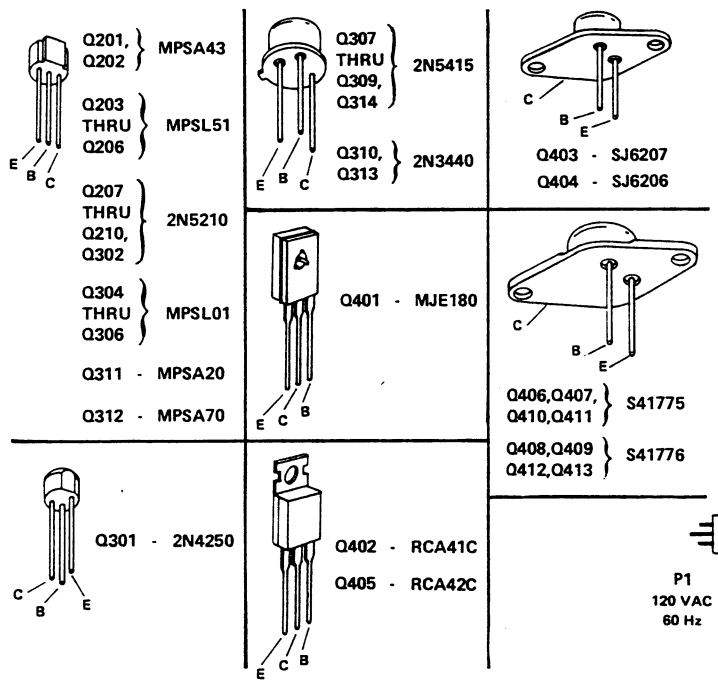
SCHEMATIC DIAGRAM

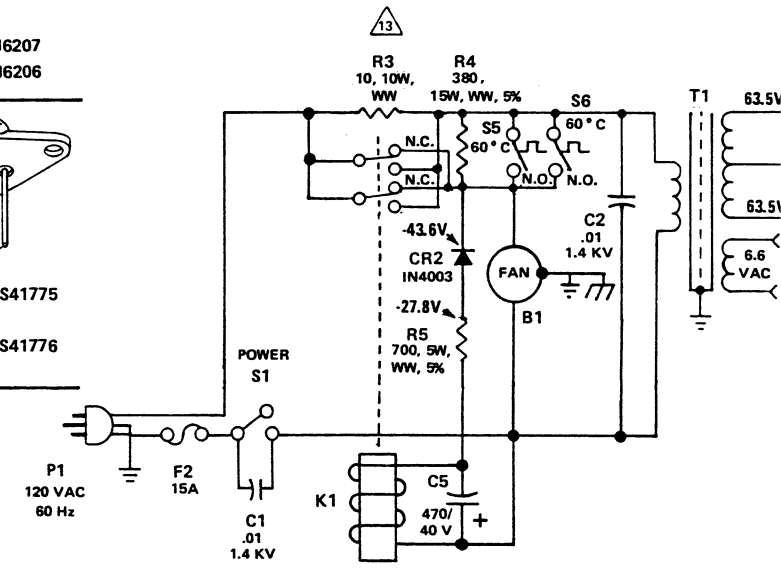
NOTES, UNLESS SPECIFIED:

1. THIS SCHEMATIC SHOWS LEFT CHANNEL ONLY.
2. CAPACITORS IN MFD, 10%. POLARIZED CAPACITORS ARE ELECTROLYTICS.
3. RESISTORS IN OHMS, 1/4 WATT, 5%.
4. LEFT CHANNEL REFERENCE DESIGNATIONS WHERE APPLICABLE ARE ODD NUMBERS, NEXT HIGHER EVEN NUMBERS ARE RIGHT CHANNEL.
5. CIRCUIT OR COMPONENT COMMON TO BOTH CHANNELS.
6. USED ON MODEL 510 ONLY.
7. USED ON MODEL 510 M ONLY.
8. POWER SUPPLY VOLTAGES @ 120 VAC LINE: IDLING (NO SIGNAL APPLIED) ±Vcc IS 86VDC +5% -0%; FULL POWER (8 OHM LOAD) ±Vcc IS 77VDC +5% -0%.
9. ADJUST R310 FOR 0VDC ± 25 mV OUTPUT OFFSET.
10. ADJUST R331 FOR A 26mV ± 8mV DROP ACROSS THE SERIES RESISTANCE (R359 AND R360 OR R361 AND R362) REPRESENTING 30mA TO 57mA QUIESCENT CURRENT PER OUTPUT TRANSISTOR.
11. ALL DC VOLTAGES MEASURED AT 120V WITH NO SIGNAL APPLIED AND INPUT JACKS SHORTED
12. ALL VOLTAGES MEASURED WITH METER RANGE SWITCH SET AT 0 dB, GAIN CONTROLS SET AT 0 dB ON THE METER.
13. RESISTOR R3 MUST BE SHORTED WITH A JUMPER BEFORE AUTO TRANSFORMER IS USED.









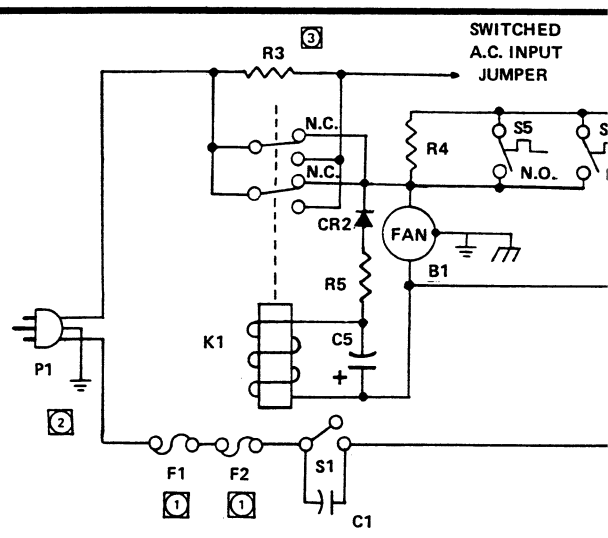
VOLTAGE	JUMPER NO. 1	JUMPER NO. 2	CONNECT SWITCHED A.C. INPUT JUMPER TO	R3 RESISTOR
240V	TB3-4 TO TB5-3	NONE	TB3-3	20 ohm, 20W
220V	TB3-4 TO TB5-2	NONE	TB3-2	20 ohm, 20W
200V	TB3-4 TO TB5-1	NONE	TB3-1	20 ohm, 20W
(CANADA)	NONE	NONE	TB3-3	10 ohm, 10W
110V	TB3-4 TO TB5-4	TB3-2 TO TB5-2	TB5-2	10 ohm, 10W
100V	TB3-4 TO TB5-4	TB3-1 TO TB5-1	TB5-1	10 ohm, 10W

[1] FUSES
- 100V: F1=15A SLO-BLO, F2=15A NORMAL BLO.
- 120V (DOMESTIC): F1 = NOT USED, F2 = 15A.
- 120V (CANADA): *F1 - 15A, F2 = 12A.
- 220/240V: F1 = NOT USED, F2 - 8A.

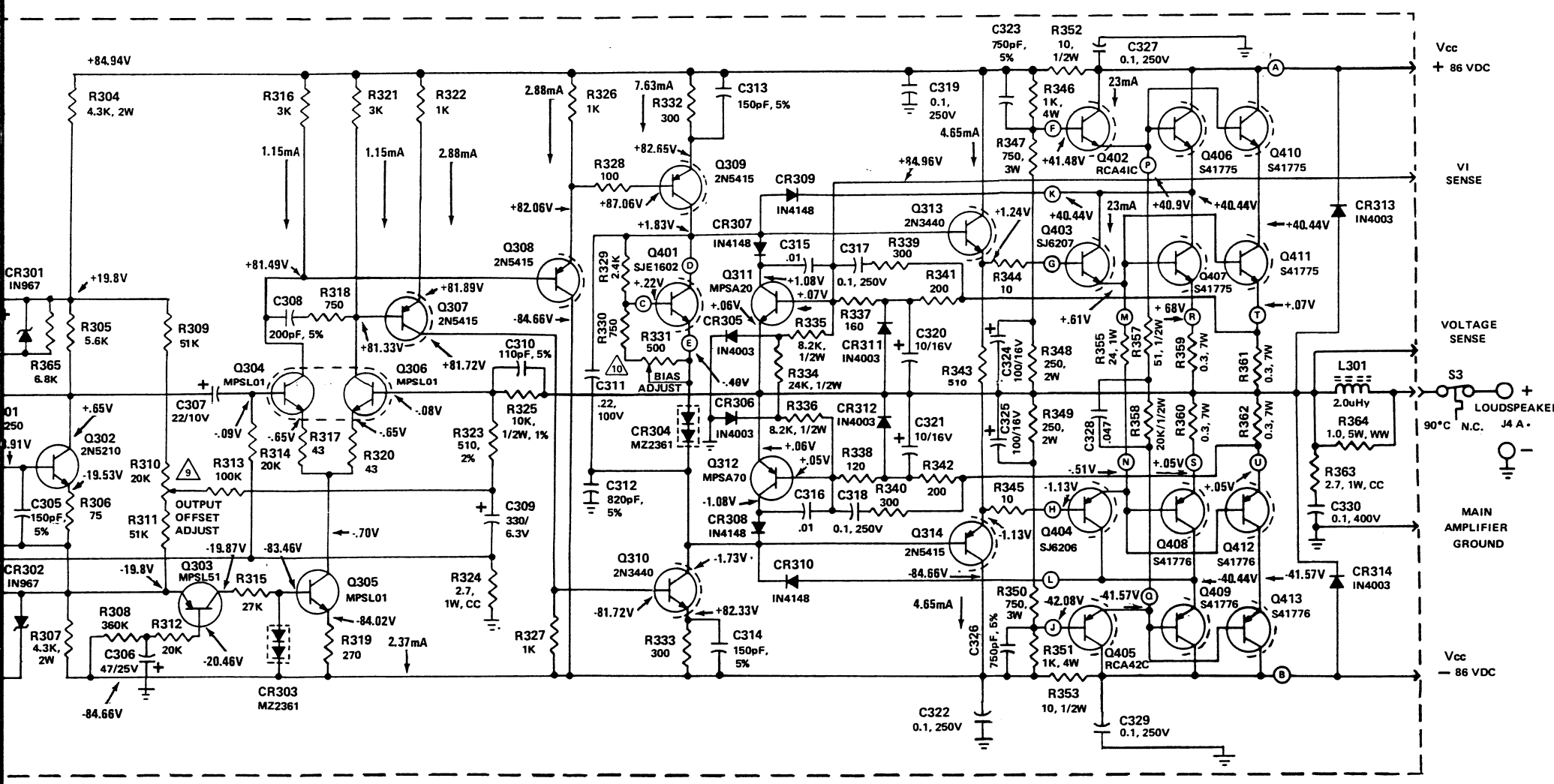
*USE F2 FUSE FOR F1 IN CANADIAN CONVERSION.

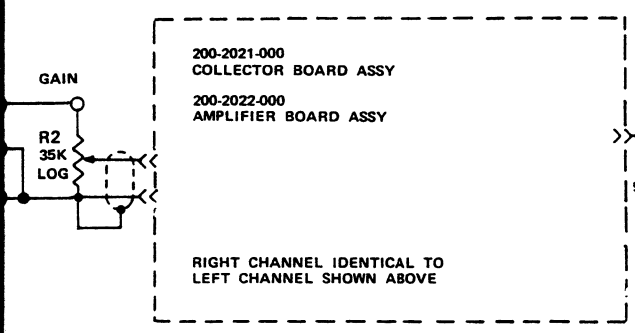
[2] AC LINE CORD FOR 100V UNITS WITHOUT GROUND CONNECTOR.

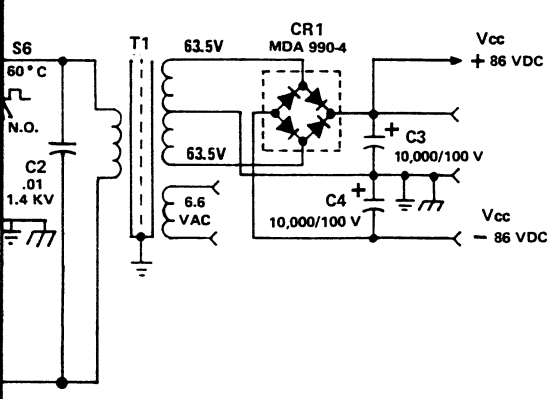
[3]

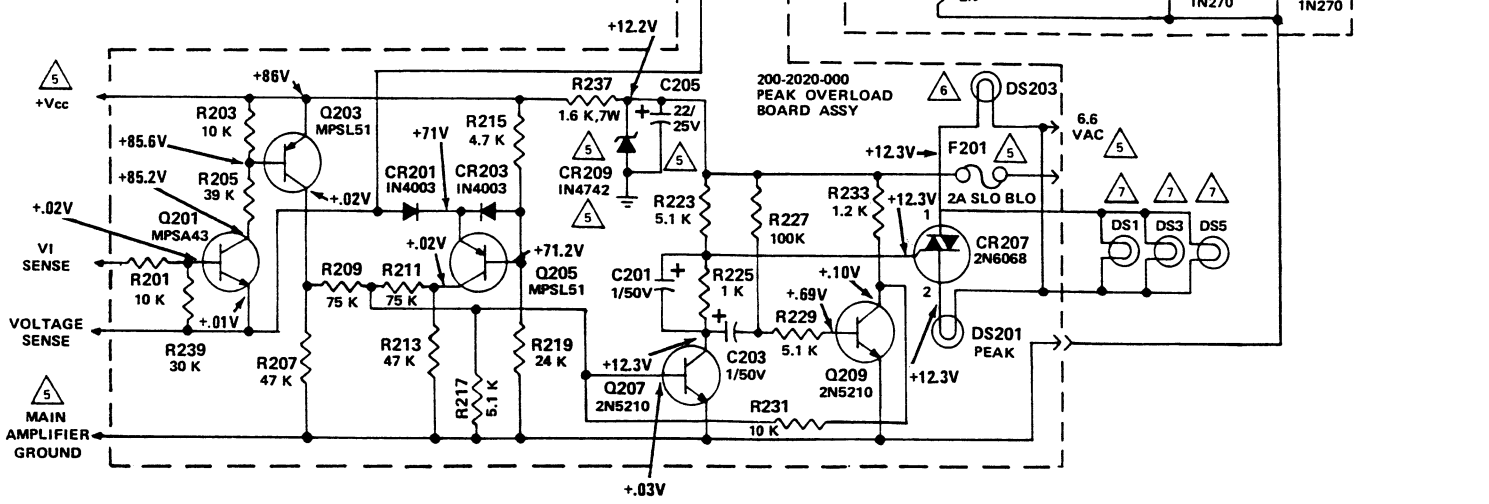


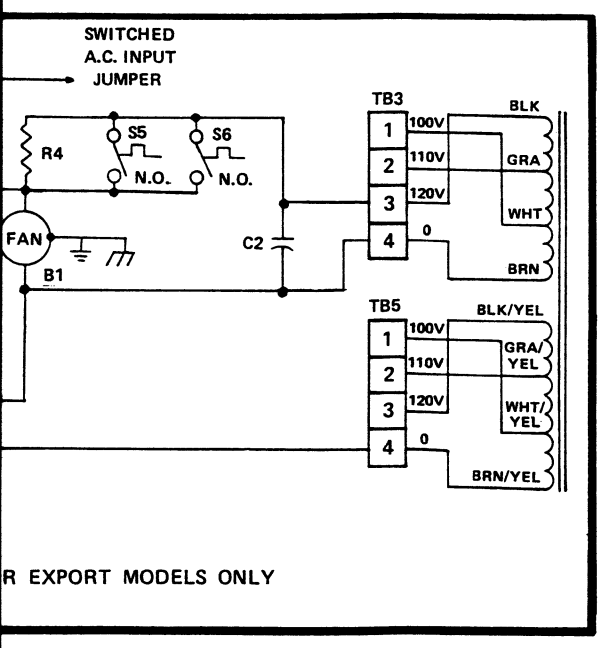
VOLTAGE CONVERSION FOR EXPORT MODELS (









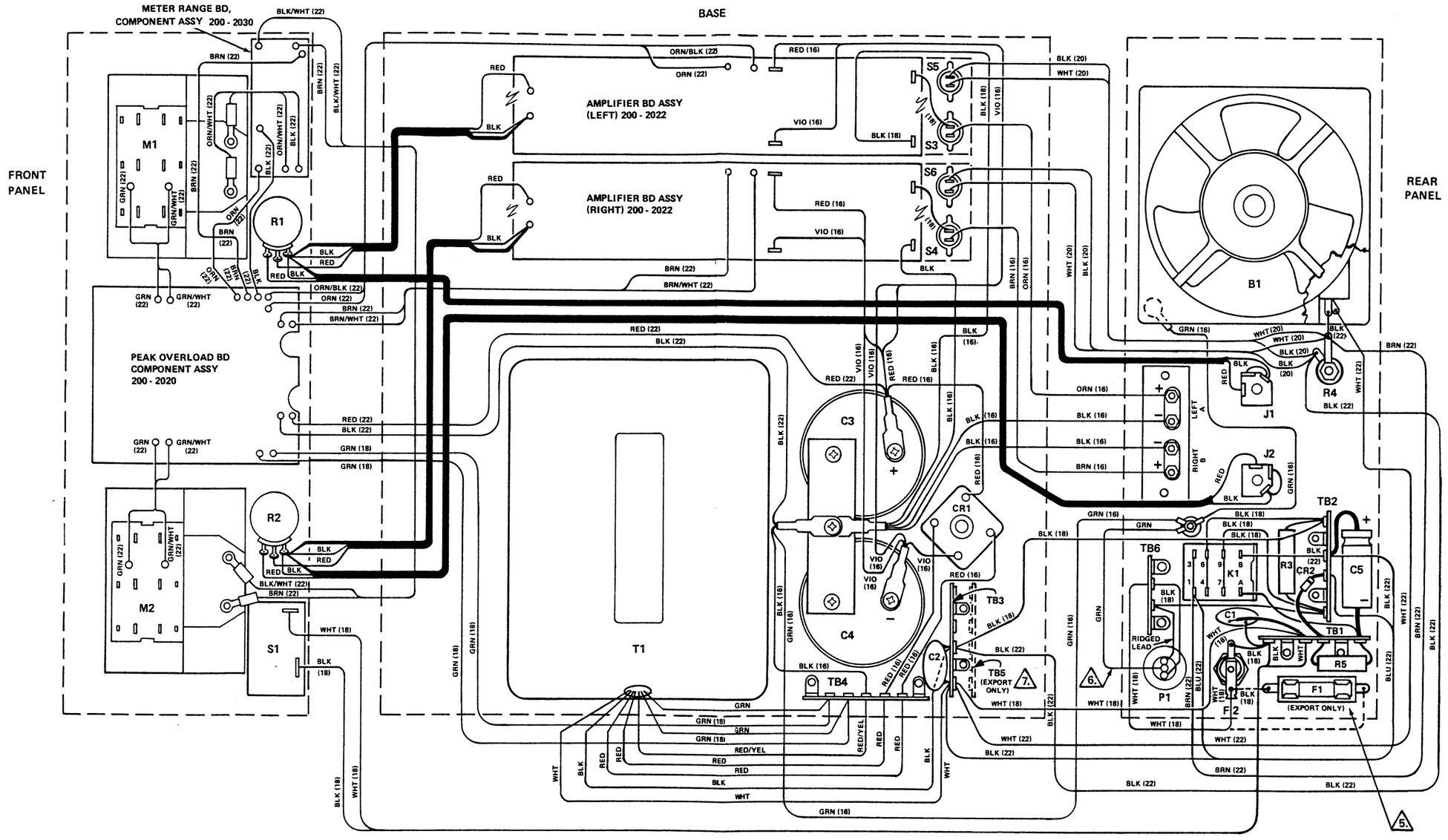


LAST REFERENCE DESIGNATION CHART					
CHASSIS		METER RANGE BOARD	PEAK OVERLOAD BD	AMPLIFIER BOARD	COLLECTOR BOARD
1-99 SERIES		100 SERIES	200 SERIES	300 SERIES	400 SERIES
C5	F2	CR108	C205	C330	Q413
CR2	S6	R110	CR209	CR314	
B1	DS6	S101B	F201	Q314	
J4B	M2		DS203	R365	
P1			Q210	L301	
K1			R240		
T1					

OUT OF SEQUENCE CHART					
CHASSIS	METER RANGE BOARD		PEAK OVERLOAD BD	AMPLIFIER BOARD	COLLECTOR BOARD
S1			R235		
			R239		
			R237		
			CR209		
			R217		

REFERENCE DESIGNATION NOT USED						
S2			R238	R221	R354	
S3			CR205	R222	R356	
			CR206			

Figure 15. Schematic Diagram



NOTES:

1. CHASSIS WIRING FOR THE MODEL 510 IS IDENTICAL EXCEPT THAT THE METERS AND ASSOCIATED WIRING HAVE BEEN ELIMINATED.
2. UNIT SHOWN IS WIRED FOR 120VAC OPERATION.
3. FOR UNIVERSAL TRANSFORMER CHASSIS WIRE AND TERMINAL STRIP JUMPER CONNECTIONS FOR VOLTAGE CONVERSION REFER TO THE SERVICE NOTES SECTION.
4. NUMBERS IN PARENTHESIS INDICATES WIRE GAUGE.

⚠5. USE F1 AND F2 FOR CANADA (120V) AND JAPAN (100V) MODELS ONLY. DISCONNECT WHITE WIRE (18 AWG) FROM TB6 TO F2 AND CONNECT TO F1 AS INDICATED BY DOTTED LINE. ADD BLACK WIRE (18AWG) FROM F1 TO F2 AS INDICATED BY DOTTED LINE.

⚠6. GREEN WIRE NOT USED ON 100V MODELS WHICH USES A 2-WIRE AC LINE CORD.

⚠7. TB5 TERMINAL STRIP USED ON 100V AND 120V (CANADA) MODELS ONLY.

Figure 16. Wiring Diagram